LAMPIRAN 1

ANALISA MATERIAL BETON

ANALISA GRADASI AGREGAT HALUS

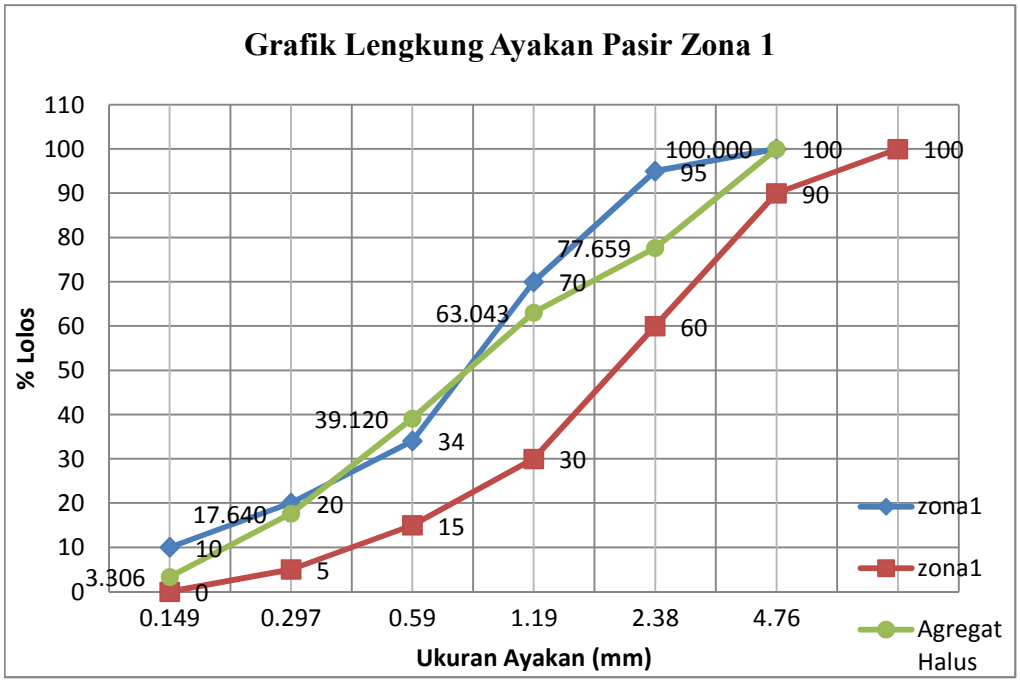
Lubang Saringan		Pasir Tertinggal		%Kumulatif	
no	mm	gram	%	Tertinggal	Lolos
3"	76.2	-	-	-	-
2.5"	63.5	-	-	-	-
2"	50.8	-	-	-	-
1.5"	38.1	-	-	-	-
1"	25.4	-	-	-	-
3/4"	19.1	-	-	-	-
1/2"	12.7	-	-	-	-
3/8"	9.5	-	-	-	100
4	4.76	100	7.447	7.447	92.553
8	2.38	200.00	14.894	22.341	77.659
16	1.19	196.27	14.616	36.957	63.043
20	0.59	321.24	23.923	60.880	39.120
50	0.297	288.44	21.480	82.360	17.640
100	0.149	192.48	14.334	96.694	3.306
200	0.075	44.39	3.306	100.000	0.000
Pan				-	-
Σ =		1342.82	100	406.680	

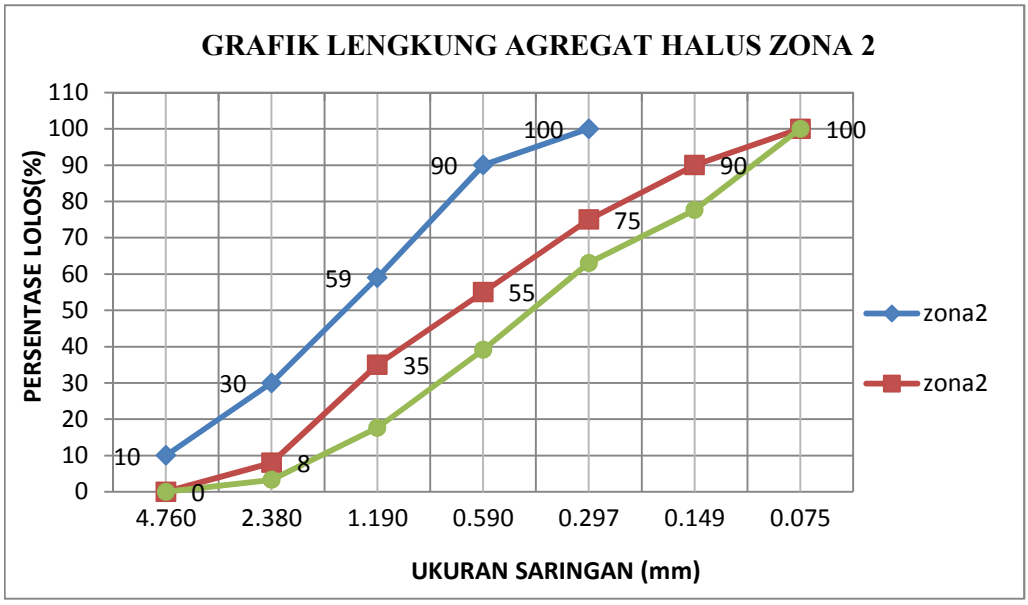
$$\text{Modulus halus pasir} = \frac{\Sigma\,\%\ yang\ \ tertahan\ \ ayakan\ \ no\,3/8"\ sampai\ no\,100}{100}$$

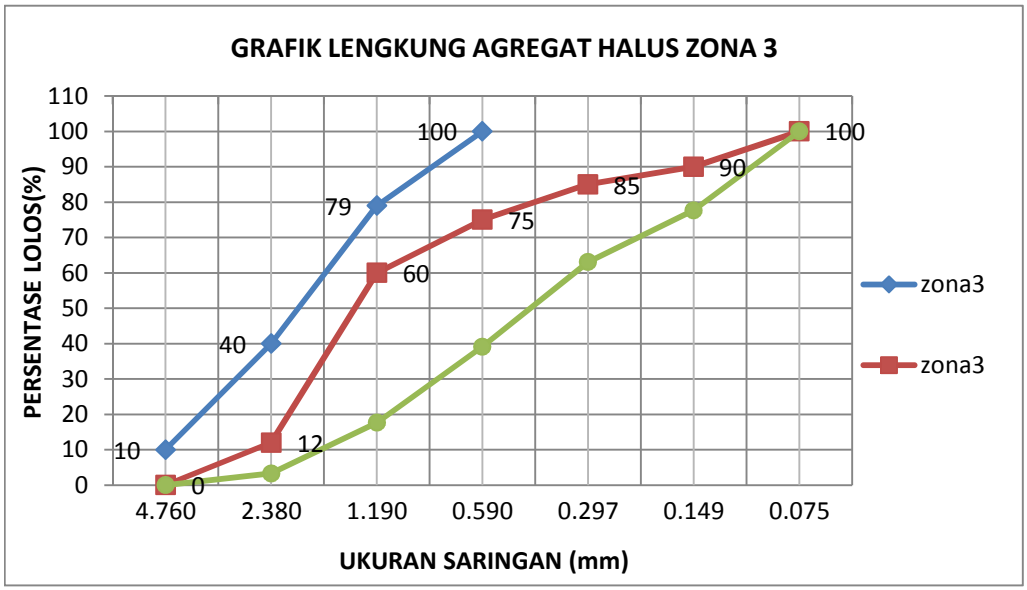
$$\text{Modulus halus pasir} = \frac{406.680}{100}$$

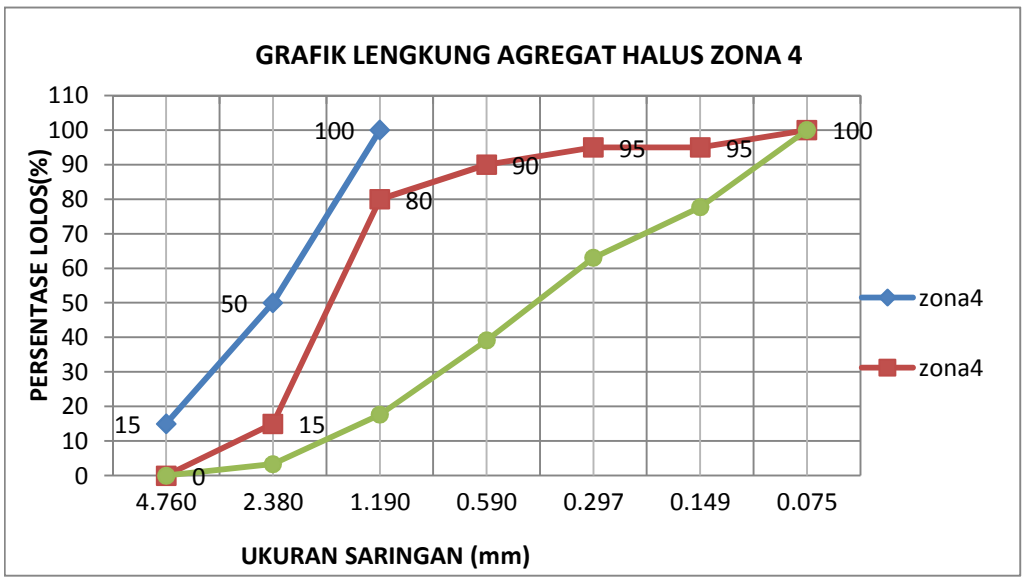
$$= 4.0668$$

Dari Grafik, maka termasuk zona = 1




GRAFIK LENGKUNG AGREGAT HALUS ZONA 2
PERSENTASE LOLOS(%)
110
100
90
80
70
60
50
40
30
20
10
0
4.760
2.380
1.190
0.590
0.297
0.149
0.075
100
90
59
30
10
0
8
35
55
75
90
100
UKURAN SARINGAN (mm)
zona2
zona2


GRAFIK LENGKUNG AGREGAT HALUS ZONA 3
PERSENTASE LOLOS(%)
110
100
90
80
70
60
50
40
30
20
10
0
4.760
2.380
1.190
0.590
0.297
0.149
0.075
100
79
40
10
0
12
60
75
85
90
100
UKURAN SARINGAN (mm)
zona3
zona3


GRAFIK LENGKUNG AGREGAT HALUS ZONA 4
PERSENTASE LOLOS(%)
110
100
90
80
70
60
50
40
30
20
10
0
4.760
2.380
1.190
0.590
0.297
0.149
0.075
100
50
15
0
15
80
90
95
95
100
UKURAN SARINGAN (mm)
zona4
zona4

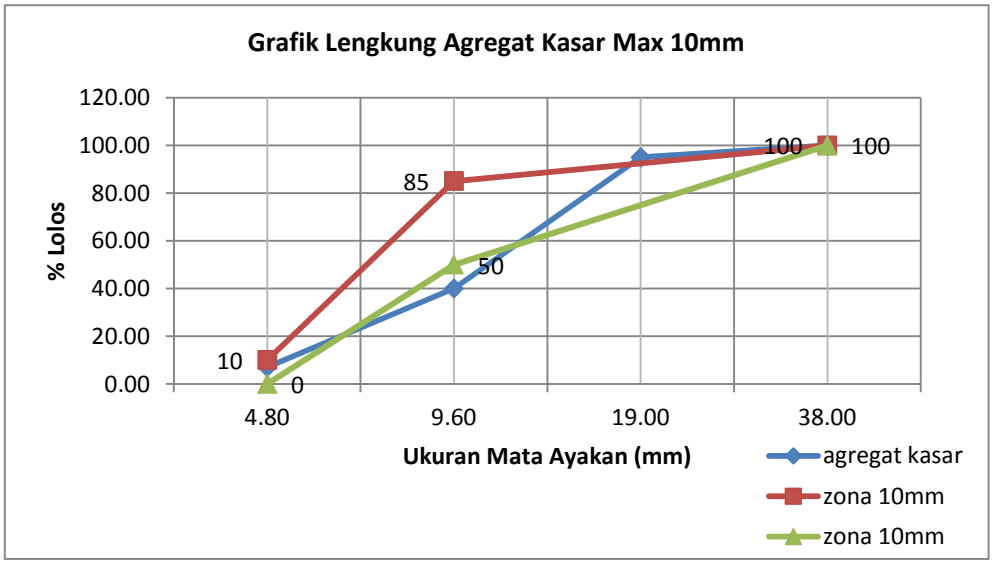
ANALISA GRADASI AGREGAT KASAR

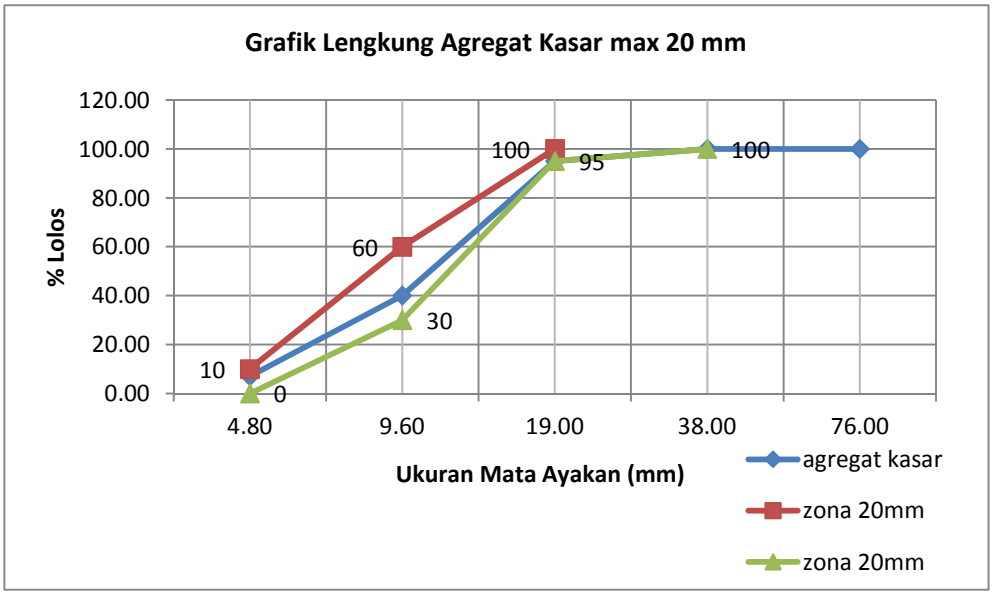
Lubang Saringan		KERIKIL			
		Tertinggal		%Kumulatif	
no	mm	gram	%	Tertinggal	Lolos
3"	76.2	-	-	-	100
2.5"	63.5	-	-	-	100
2"	50.8	-	-	-	100
1.5"	38.1	-	-	-	100
1"	25.4	0.00	0.00	0.00	100.00
0.75"	19.1	500.00	5.00	5.00	95.00
0.375"	9.5	5500.00	55.00	60.00	40.00
4	4.76	3300.00	33.00	93.00	7.00
8	2.38	700.00	7.00	100.00	-
16	1.19	-	-	100.00	-
20	0.85	-	-	100.00	-
50	0.297	-	-	100.00	-
100	0.149	-	-	100.00	-
200	0.075	-	-	100.00	-
Pan		-	-	100.00	-
Σ =		10000	100.0	858.00	

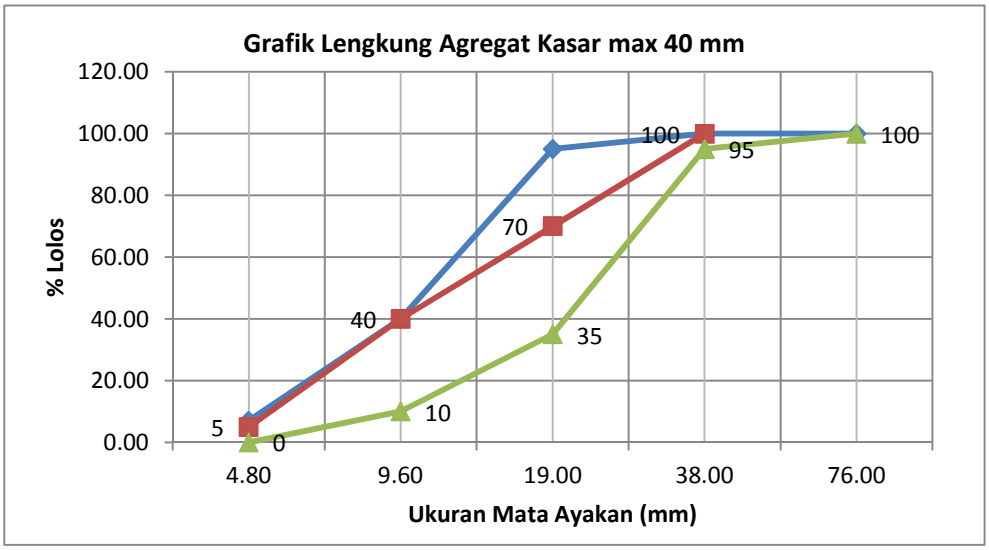
Dari grafik, zona gradasi = 20 mm

Modulus halus agregat kasar = $\frac{\Sigma\ \%\ yang\ tertahan\ ayakan\ no\ 3/4"+3/8"\ s}{100}$

= 8.58




Grafik Lengkung Agregat Kasar max 20 mm
120.00
100.00
80.00
60.00
40.00
20.00
0.00
% Lolos
100
95
100
60
30
10
0
4.80
9.60
19.00
38.00
76.00
Ukuran Mata Ayakan (mm)
agregat kasar
zona 20mm
zona 20mm


Grafik Lengkung Agregat Kasar max 40 mm
120.00
100.00
80.00
60.00
40.00
20.00
0.00
% Lolos
100
95
100
70
40
35
5
10
0
4.80
9.60
19.00
38.00
76.00
Ukuran Mata Ayakan (mm)

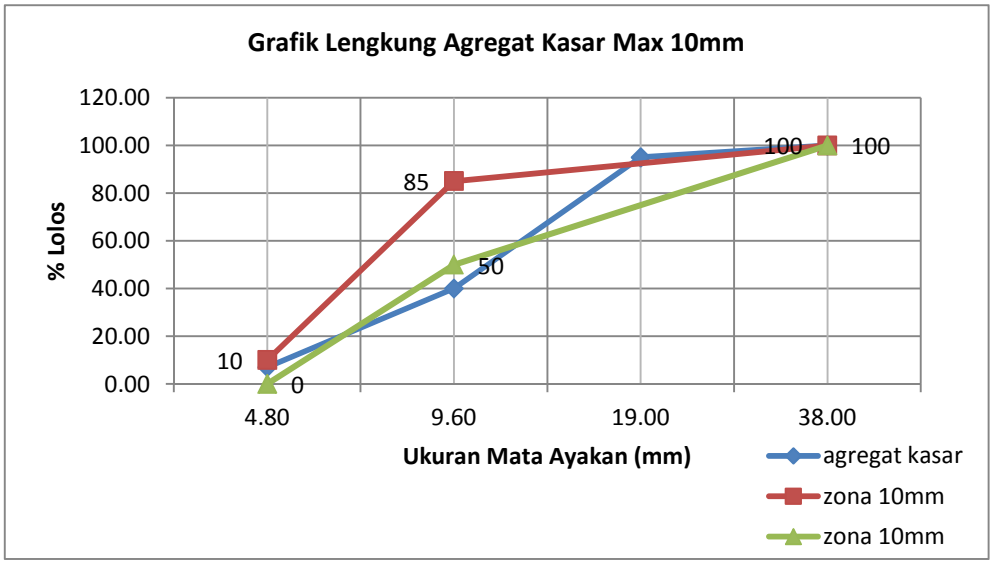
ANALISA GRADASI AGREGAT KASAR

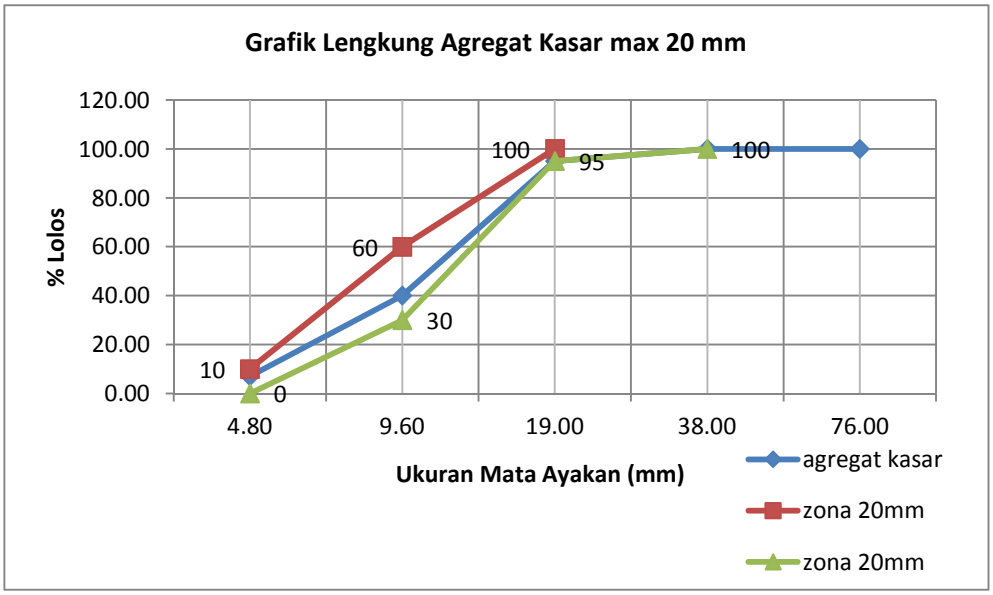
Lubang Saringan		ONYX			
		Tertinggal		%Kumulatif	
no	mm	gram	%	Tertinggal	Lolos
3"	76.2	-	-	-	100
2.5"	63.5	-	-	-	100
2"	50.8	-	-	-	100
1.5"	38.1	-	-	-	100
1"	25.4	0.00	0.00	0.00	100.00
0.75"	19.1	500.00	5.00	5.00	95.00
0.375"	9.5	5500.00	55.00	60.00	40.00
4	4.76	3300.00	33.00	93.00	7.00
8	2.38	700.00	7.00	100.00	-
16	1.19	-	-	100.00	-
20	0.85	-	-	100.00	-
50	0.297	-	-	100.00	-
100	0.149	-	-	100.00	-
200	0.075	-	-	100.00	-
Pan		-	-	100.00	-
Σ =		10000	100.0	858.00	

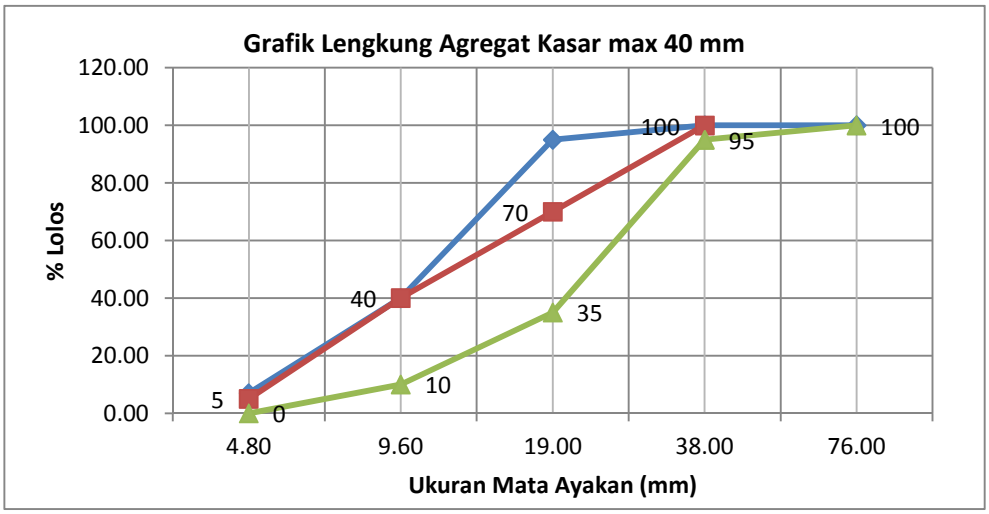
Dari grafik, zona gradasi = 20 mm

Modulus halus agregat kasar = $\frac{\Sigma\ \%\ yang\ tertahan\ ayakan\ no\ 3/4"+3/8"\ s}{100}$

= 8.58




Grafik Lengkung Agregat Kasar max 20 mm
120.00
100.00
80.00
60.00
40.00
20.00
0.00
% Lolos
100
95
100
60
30
10
0
4.80
9.60
19.00
38.00
76.00
Ukuran Mata Ayakan (mm)
agregat kasar
zona 20mm
zona 20mm


Grafik Lengkung Agregat Kasar max 40 mm
120.00
100.00
80.00
60.00
40.00
20.00
0.00
% Lolos
100
95
100
70
40
35
10
5
0
4.80
9.60
19.00
38.00
76.00
Ukuran Mata Ayakan (mm)

KADAR AIR AGREGAT HALUS DAN KASAR

KADAR AIR AGREGAT HALUS
PASIR

Nomor Contoh			1	
Nomor Talam			A	B
1	Berat Talam + Contoh basah	(gr)	31.9	105.5
2	Berat Talam + Contoh kering	(gr)	31.2	104.9
3	Berat Air = (1)-(2)	(gr)	0.7	0.6
4	Berat Talam	(gr)	6.1	6.1
5	Berat Contoh Kering = (2)-(4)	(gr)	25.1	98.8
6	Kadar Air = (3)/(5)	(%)	0.0600	0.0040
7	Kadar Air rata-rata	(%)	0.050000	

KADAR AIR AGREGAT KASAR
KERIKIL

Nomor Contoh			2	
Nomor Talam			A	B
1	Berat Talam + Contoh basah	(gr)	80.4	79.2
2	Berat Talam + Contoh kering	(gr)	79.9	79
3	Berat Air = (1)-(2)	(gr)	0.5	0.2
4	Berat Talam	(gr)	5.7	6.1
5	Berat Contoh Kering = (2)-(4)	(gr)	74.2	72.9
6	Kadar Air = (3)/(5)	(%)	0.0067	0.0042
7	Kadar Air rata-rata	(%)	0.00548	

KADAR AIR AGREGAT KASAR
ONYX

Nomor Contoh			1	
Nomor Talam			A	B
1	Berat Talam + Contoh basah	(gr)	80.4	79.2
2	Berat Talam + Contoh kering	(gr)	79.9	79
3	Berat Air = (1)-(2)	(gr)	0.5	0.2
4	Berat Talam	(gr)	5.7	6.1
5	Berat Contoh Kering = (2)-(4)	(gr)	74.2	72.9
6	Kadar Air = (3)/(5)	(%)	0.0110	0.0072
7	Kadar Air rata-rata	(%)	0.00910	

PEMERIKSAAN BERAT ISI AGREGAT HALUS DAN KASAR

PEMERIKSAAN BERAT ISI AGREGAT HALUS

NO

1	Berat takaran	(gr)	1640	1640	1640
2	Berat takaran + air	(gr)	4800	4800	4800
3	Berat air = (2)-(1)	(gr)	3160	3160	3160
4	Volume air = (3)/(1)	(cc)	3160.0	3160	3160
	CARA		**BIASA**	**GOYANG**	**TUSUK**
5	Berat Takaran	(gr)	1640	1640	1640
6	Berat takaran + benda uji	(gr)	5560	5980	6820
7	Berat benda uji = (6)-(5)	(gr)	3920	4340	5180
8	Berat isi agregat halus = (7)/(4)	(gr/cc)	1.2405	1.3734	1.6392
9	Berat isi agregat halus rata-rata	(gr/cc)		1.418	

PEMERIKSAAN BERAT ISI AGREGAT KASAR

1	Berat takaran	(gr)	1640	1640	1640
2	Berat takaran + air	(gr)	4800	4800	4800
3	Berat air = (2)-(1)	(gr)	3160	3160	3160
4	Volume air = (3)/(1)	(cc)	3160	3160	3160
	CARA		**BIASA**	**GOYANG**	**TUSUK**
5	Berat Takaran	(gr)	1640	1640	1640
6	Berat takaran + benda uji	(gr)	6180	6440	6700
7	Berat benda uji = (6)-(5)	(gr)	4540	4800	5060
8	Berat isi agregat halus = (7)/(4)	(gr/cc)	1.4367	1.5190	1.601265823
9	Berat isi agregat kasar rata-rata	(gr/cc)		1.52	

PEMERIKSAAN BERAT ISI AGREGAT ONYX

1	Berat takaran	(gr)	1640	1640	1640
2	Berat takaran + air	(gr)	4800	4800	4800
3	Berat air = (2)-(1)	(gr)	3160	3160	3160
4	Volume air = (3)/(1)	(cc)	3160	3160	3160
	CARA		**BIASA**	**GOYANG**	**TUSUK**
5	Berat Takaran	(gr)	1640	1640	1640
6	Berat takaran + benda uji	(gr)	6000	6340	6320
7	Berat benda uji = (6)-(5)	(gr)	4360	4700	4680
8	Berat isi agregat halus = (7)/(4)	(gr/cc)	1.3797	1.4873	1.481012658
9	Berat isi agregat kasar rata-rata	(gr/cc)		1.45	

BERAT JENIS DAN PENYERAPAN AGREGAT HALUS

NOMOR CONTOH			A	B
Berat benda uji kering permukaan jenuh	500	(gr)	500	500
Berat benda uji kering oven	Bk	(gr)	497.59	497.18
Berat benda uji dalam air	B	(gr)	681.2	658.4
Berat piknometer + benda uji (ssd) + air (pd suhu kamar)	Bt	(gr)	972.4	969.4

NOMOR CONTOH		A	B	Rata - rata
Berat Jenis Curah (Bulk Spesific Grafity)	Bk/(B+500-Bt)	2.383	2.631	2.507
Berat Jenis Kering Permukaan Jenuh (Bulk Spesific Grafity Saturated Surface Dry)	500/(B+500-Bt)	2.395	2.646	2.520
Berat Jenis Semu Apparent Spesific Gravity)	Bk/(B+Bk-Bt)	2.411	2.670	2.541
Penyerapan (%) (Absorption)	(500-Bk)/Bkx100%	0.484	0.567	0.526

BERAT JENIS DAN PENYERAPAN AGREGAT KASAR

Nomor Contoh			A	B
Berat benda uji kering permukaan jenuh	Bj	(gr)	4998.6	4995
Berat benda uji kering oven	Bk	(gr)	4952	4949.2
Berat benda uji dalam air	Ba	(gr)	3167	3162

Nomor Contoh		A	B	Rata - Rata
Berat Jenis Curah (Bulk Spesific Grafity)	Bk/(Bj-Ba)	2.704	2.700	2.702
Berat Jenis Kering Permukaan Jenuh (Bulk Spesific Grafity Saturated Surface Dry)	Bj/(Bj-Ba)	2.729	2.725	2.727
Berat Jenis Semu Apparent Spesific Gravity)	Bk/(Bk-Ba)	2.774	2.769	2.772
Penyerapan (%) (Absorption)	(Bj-Bk)/Bkx100%	0.941	0.925	0.933

BERAT JENIS DAN PENYERAPAN AGREGAT ONYX

Nomor Contoh			A	B
Berat benda uji kering permukaan jenuh	Bj	(gr)	4953.4	4989.6
Berat benda uji kering oven	Bk	(gr)	4943.2	4966
Berat benda uji dalam air	Ba	(gr)	3047.5	3082

Nomor Contoh		A	B	Rata - Rata
Berat Jenis Curah (Bulk Spesific Grafity)	Bk/(Bj-Ba)	2.594	2.603	2.598
Berat Jenis Kering Permukaan Jenuh (Bulk Spesific Grafity Saturated Surface Dry)	Bj/(Bj-Ba)	2.599	2.616	2.607
Berat Jenis Semu Apparent Spesific Gravity)	Bk/(Bk-Ba)	2.608	2.636	2.622
Penyerapan (%) (Absorption)	(Bj-Bk)/Bkx100%	0.206	0.475	0.341

Data Pengujian Agregat

No	Data Pengujian Agregat	Hasil	Satuan
1	Analisa ayakan Agg. Halus	zona 1	
2	Agregat maksimum Agg. Kasar	20	mm
3	Agregat maksimum Agg. Onyx	20	mm
4	Berat Jenis Pasir	2.52006933	kg/m3
5	Berat Jenis Kerikil	2.72706512	kg/m3
6	Berat Jenis Onyx	2.6073124	kg/m3
7	Kadar Air Pasir	0.05	%
8	Absorbsi air pada agregat halus	0.52576675	%
9	Kadar Air Kerikil	0.05448	%
10	Absorbsi air pada agregat kerikil	0.93321801	%
11	Kadar Air Onyx	0.0091	%
12	Absorbsi air pada agregat onyx	0.34078782	%

KEBUTUHAN KERIKIL (TIAP COR/0.1 M3)

No	Lubang Saringan	Kebutuhan Kerikil / Cor	Presentase	Kebutuhan	Kebutuhan Benda uji	Total
	(mm)	kg	%	kg	set	kg
1	25	91.17	0%	0.000	4	0
2	19		5%	4.559		18.2343474
3	9.5		60%	54.703		218.812168
4	4.75		35%	31.910		127.640431
5	2.38		0%	0.000		0
	Total		100%	91.172		364.686947

KEBUTUHAN ONYX (TIAP COR/0.1 M3)

No	Lubang Saringan	Kebutuhan Kerikil / Cor	Presentase	Kebutuhan	Kebutuhan Benda uji	Total
	(mm)	kg	%	kg	set	kg
1	25	88.88	0%	0.000	10	0
2	19		5%	4.444		44.4421004
3	9.5		60%	53.331		533.305205
4	4.75		35%	31.109		311.094703
5	2.38		0%	0.000		0
	Total		100%	88.884		888.842008

FORMULIR PERANCANGAN CAMPURAN BETON

NO	URAIAN	TABEL / GRAFIK	AGREGAT ONYX		AGREGAT KERIKIL	
1	Kuat tekan yang disyaratkan (2 HR, 5%)	Ditetapkan	20	Mpa	20	Mpa
2	Deviasi standar	Diketahui	-		-	
3	Nilai Tambah (Margin)	(K=1,64) 1,64*(2)	12	Mpa	12	Mpa
4	Kuat tekan rata2 yg ditargetkan	(1) + (3)	32	Mpa	32	Mpa
5	Jenis Semen	Ditetapkan	Normal (Tipe I)		Normal (Tipe I)	
6	Jenis Agregat Kasar	Ditetapkan	Batu Onyx		Batu pecah	
	Jenis Agregat Halus	Ditetapkan	Pasir Lumajang		Pasir Lumajang	
7	Faktor Air semen Bebas	Tabel 2, Grafik 1/2	0.4		0.4	
8	Faktor air semen Maksimum	Ditetapkan	0.6		0.6	
9	Slump	Ditetapkan	60 - 180 mm		60 - 180 mm	
10	Ukuran Agregat Maksimum	Ditetapkan	20	mm	20	mm
11	Kadar Air Bebas	Tabel 3	205	kg/m3	205	kg/m3
12	Jumlah semen	(11) : (7)	512.5	kg/m3	512.5	kg/m3
13	Jumlah Semen Maksimum	Ditetapkan	-		-	
14	Jumlah Semen Minimum	Tabel 4,5,6	275	kg/m3	275	kg/m3
15	FAS yg disesuaikan	-	-		-	
16	Susunan besar butir agregat halus	Grafik 3 - 6	Zona 1		Zona 1	
17	Persen agregat halus	Grafik 13 - 15	0.44		0.44	
18	Berat jenis relatif agregat (SSD)	Diketahui	2.569	kg/m3	2.636	kg/m3
19	Berat isi beton	Grafik 16	2310	kg/m3	2360	kg/m3
20	Kadar agregat gabungan	(19) - (11) - (12)	1592.5	kg/m3	1642.5	kg/m3
21	Kadar agregat halus	(17) * (20)	700.7	kg/m3	722.7	kg/m3
22	Kadar agregat kasar	(20) - (21)	891.8	kg/m3	919.8	kg/m3

Banyaknya Bahan	**Semen**	**Air**	**Pasir**	**Onyx**	**Semen**	**Air**	**Pasir**	**Kerikil**
	(kg)	**(kg/lt)**	**(kg)**	**(kg)**	**(kg)**	**(kg/lt)**	**(kg)**	**(kg)**
Tiap m3 dg ketelitian 5kg (Teoritis)	512.50	205	700.700	891.800	512.50	205	722.700	919.800
Tiap campuran uji 0,1 m3	51.25	20.50	70.07	89.18	51.25	20.50	72.27	91.98
Tiap m3 dg ketelitian 5kg (Aktual)	512.50	211.29	697.366	888.842	512.50	216.52	719.262	911.717
Tiap campuran uji 0,1 m3	51.25	21.13	69.74	88.88	51.25	21.65	71.93	91.17
Proporsi (Teoritis) (1/3)	1.00	0.40	1.37	1.74	1.00	0.40	1.41	1.79
Proporsi (Aktual)	1.00	0.41	1.36	1.73	1.00	0.42	1.40	1.78

LAMPIRAN 2

KUAT TEKAN BETON

Kuat Tekan Beton Normal

	NAMA	TEGANGAN	Rata - Rata (Xrt)	X1 - Xrt	$(X1 - Xrt)^2$	Sd	Cv
1	RC-N1-1	30.80	35.72	-4.92603	24.2657	5.2924	14.8145
2	RC-N1-2	25.77		-9.95317	99.0656		
3	RC-N2-1	30.91		-4.81046	23.1405		
4	RC-N3-1	23.11		-12.61120	159.0424		
5	RC-N4-1	31.78		-3.94371	15.5528		
6	RC-N5-1	40.16		4.43487	19.6681		
7	RC-N5-2	43.68		7.95965	63.3560		
8	RC-N6-1	41.78		6.05280	36.6364		
9	RC-N6-2	30.11		-5.61943	31.5779		
10	RC-N7-1	38.77		3.04807	9.2907		
11	RC-N7-2	37.67		1.95019	3.8032		
12	RC-N8-1	37.56		1.83462	3.3658		
13	RC-N8-2	39.87		4.14595	17.1889		
14	RC-N9-1	38.71		2.99029	8.9418		
15	RC-N10-1	41.03		5.30162	28.1071		
16	RC-N10-2	39.87		4.14595	17.1889		
	Rata - Rata	35.72		0.0000	560.1921		

Kuat Tekan Beton Limbah Onyx

No	NAMA	TEGANGAN	Rata - Rata (Xrt)	X1 - Xrt	(X1 - Xrt)²	Sd	Cv
1	RC-O1-1	31.78	32.99	-1.21345	1.4725	2.5911	7.8532
2	RC-O1-2	37.56		4.56488	20.8381		
3	RC-O2-1	32.94		-0.05778	0.0033		
4	RC-O2-2	27.56		-5.43163	29.5026		
5	RC-O3-1	35.02		2.02242	4.0902		
6	RC-O3-2	31.20		-1.79128	3.2087		
7	RC-O4-1	34.67		1.67572	2.8080		
8	RC-O5-1	32.94		-0.05778	0.0033		
9	RC-O6-1	32.36		-0.63562	0.4040		
10	RC-O6-2	32.94		-0.05778	0.0033		
11	RC-O7-1	37.27		4.27596	18.2839		
12	RC-O7-2	31.72		-1.27123	1.6160		
13	RC-O8-1	33.86		0.86675	0.7513		
14	RC-O8-2	27.79		-5.20050	27.0452		
15	RC-O9-1	32.53		-0.46227	0.2137		
16	RC-O9-2	31.49		-1.50237	2.2571		
17	RC-O10-1	32.99		0.00000	0.0000		
18	RC-O10-2	35.88		2.88916	8.3473		
	Rata - Rata			-1.39	120.8485		

Uji Kuat Tekan Beton Normal

Jenis Variasi : Agregat Kerikil (Beton Normal)

Jenis Sample : Silinder 15x30 cm

Tipe Semen : PPC

No	Kode Beton	Tanggal Pengecoran	Tanggal Pengujian	Umur (hari)	Berat (kg)	Luas (Cm2)	Kuat Tekan (Mpa)	Kuat Tekan Rata-rata Total (Mpa)
1	RC-N1-S1	16/08/2017	14/09/2017	28	13,25	176,786	30.80	35,72
2	RC-N1-S2	16/08/2017	14/09/2017	28	13		25.77	
3	RC-N2-S1	16/08/2017	14/09/2017	28	13,15		30.91	
4	RC-N3-S1	16/08/2017	14/09/2017	28	13,25		23.11	
5	RC-N4-S1	16/08/2017	14/09/2017	28	13		31.78	
6	RC-N5-S1	18/08/2017	18/09/2017	28	13		40.16	
7	RC-N5-S2	18/08/2017	18/09/2017	28	13,25		43.68	
8	RC-N6-S1	18/08/2017	18/09/2017	28	13,65		41.78	
9	RC-N6-S2	18/08/2017	18/09/2017	28	13,3		30.11	
10	RC-N7-S1	18/08/2017	18/09/2017	28	13,2		38.77	
11	RC-N7-S2	18/08/2017	18/09/2017	28	13,15		37.67	
12	RC-N8-S1	18/08/2017	18/09/2017	28	13,1		37.56	
13	RC-N8-S2	18/08/2017	18/09/2017	28	13,6		39.87	
14	RC-N9-S1	21/08/2017	19/09/2017	28	13,25		38.71	
15	RC-N10-S1	21/08/2017	19/09/2017	28	13,05		41.03	
16	RC-N10-S2	21/08/2017	19/09/2017	28	13		39.87	

Uji Kuat Tekan Beton Onyx

Jenis Variasi : Agregat Batu Onyx

Jenis Sample : Silinder 15x30 cm

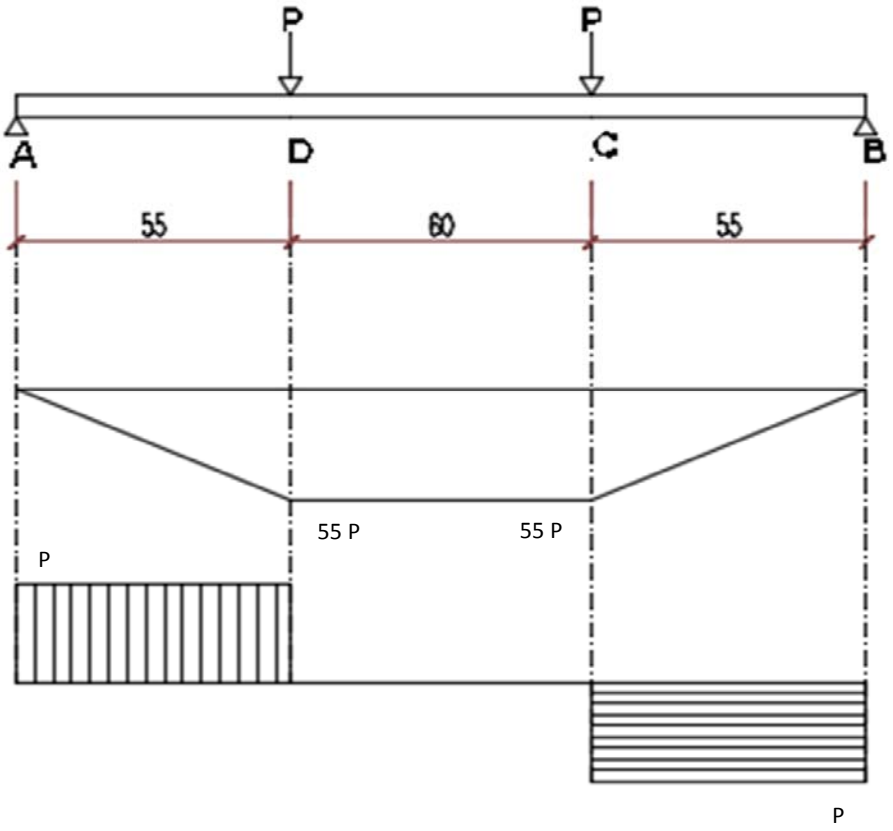
Tipe Semen : PPC

No	Kode Beton	Tanggal Pengecoran	Tanggal Pengujian	Umur (hari)	Berat (kg)	Luas (Cm2)	Kuat Tekan (Mpa)	Kuat Tekan Rata-rata Total (Mpa)
1	RC-O1-S1	21/08/2017	19/09/2017	28	12,5	176,786	31.78	32,92
2	RC-O1-S2	21/08/2017	19/09/2017	28	13,15		37.56	
3	RC-O2-S1	21/08/2017	19/09/2017	28	13,05		32.94	
4	RC-O2-S1	21/08/2017	19/09/2017	28	12,9		27.56	
5	RC-O3-S1	23/08/2017	20/09/2017	28	13,15		35.02	
6	RC-O3-S2	23/08/2017	20/09/2017	28	13,1		31.20	
7	RC-O4-S1	25/08/2017	22/09/2017	28	13,35		34.67	
8	RC-O5-S1	25/08/2017	22/09/2017	28	13,2		32.94	
9	RC-O6-S1	26/08/2017	25/09/2017	28	12,9		32.36	
10	RC-O6-S2	26/08/2017	25/09/2017	28	13		32.94	
11	RC-O7-S1	26/08/2017	25/09/2017	28	12,9		37.27	
12	RC-O7-S2	26/08/2017	25/09/2017	28	13,05		31.72	
13	RC-O8-S1	26/08/2017	25/09/2017	28	13,25		33.86	
14	RC-O8-S2	26/08/2017	25/09/2017	28	13,25		27.79	
15	RC-O9-S1	26/08/2017	25/09/2017	28	13,2		32.53	
16	RC-O9-S2	26/08/2017	25/09/2017	28	13		31.49	
17	RC-O10-S1	26/08/2017	25/09/2017	28	13		32.99	
18	RC-O10-S2	26/08/2017	25/09/2017	28	13,2		35.88	

LAMPIRAN 3

ANALISA BALOK BETON BERTULANG

PERMODELAN STATIKA BALOK

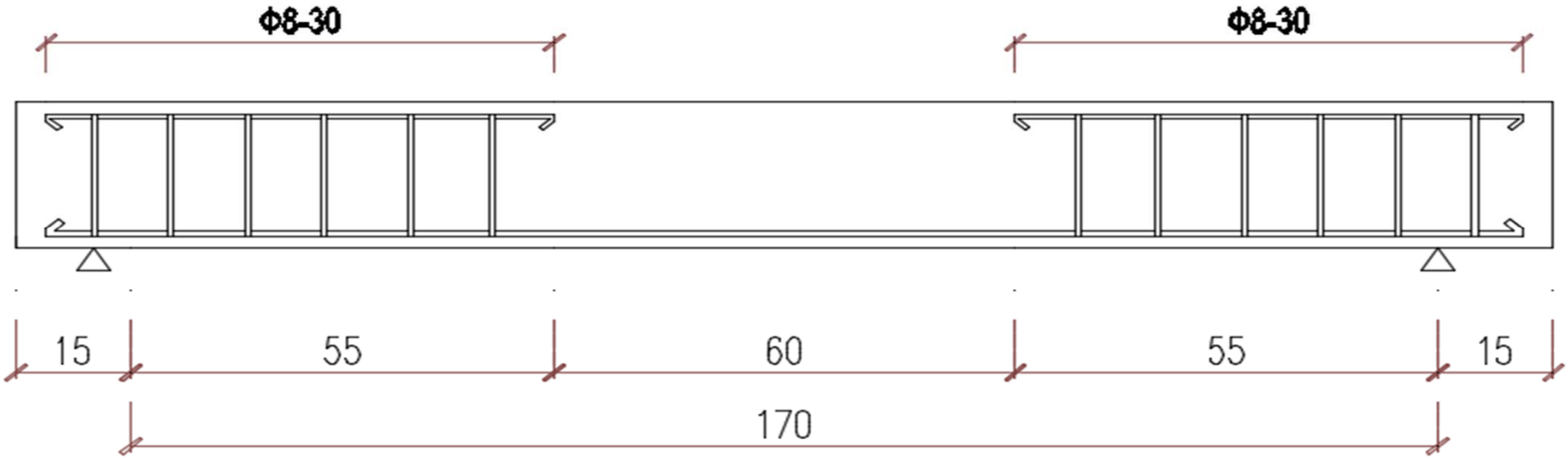


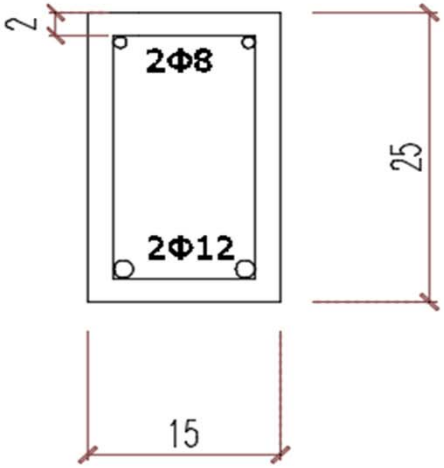
Gambar : Bidang Momen dan Bidang Gaya Normal

ΣMA = 0
= 55 P + 115 P - RB x 170
= 170 P - 170 RB
RB = P =RA

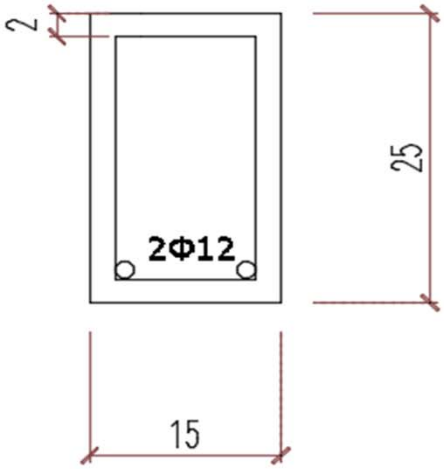
Mu = MD
= RA x 55
= 55 P

SKETSA PENULANGAN BALOK



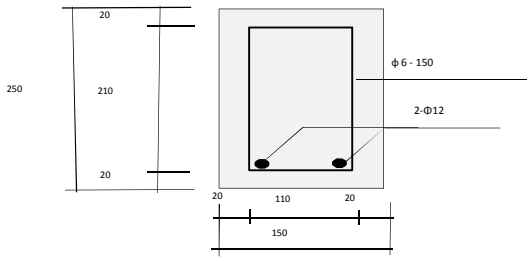


Penampang Tepi



Penampang Tengah

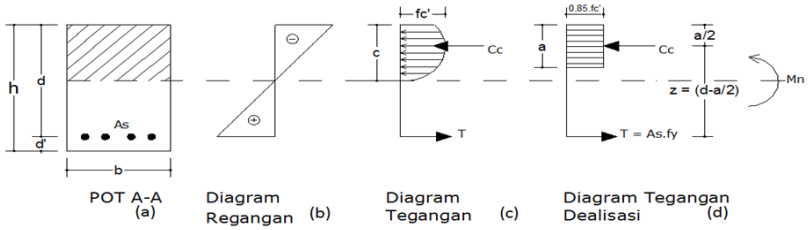
PENGECEKAN MOMEN ULTIMATE SPESIMEN BALOK



Data Balok

Tulangan Bawah	=	12	mm	As	=	2.2608	cm2
Sengkang	=	8	mm	ρ_s	=	0.01392	
Jarak Sengkang	=	100	mm				
Selimut Atas	=	20	mm	fy	=	4405.19	kg/cm2
Selimut Bawah	=	20	mm	fc'	=	347.011	kg/cm2
Selimut Samping	=	20	mm	Ec	=	2039440	kg/cm2
Lebar Balok (b)	=	150	mm	Es	=	279582	kg/cm2
Tinggi Balok (h)	=	250	mm	ε_{cm}	=	0.003	
Kedalaman Balok (	=	230	mm				
Panjang Balok	=	2	m	α	=	0.85	

A. Diagram Tegangan Regangan Balok



B. Perhitungan Momen Nominal Balok

a. Keseimbangan :

$$Cc = Ts$$

$$a = \frac{As \times fy}{0.85 \times fc' \times b \times B1}$$

$$a = 2.74511 \text{ cm}$$

b. Berat Sendiri (qu) :

$$qu = b \times h \times bj$$

$$= 0.15 \times 0.25 \times 2400$$

$$= 90 \text{ kg/m}$$

$$= 0.9 \text{ kg/cm}$$

c. Cek Rasio Tulangan

$$\rho = \frac{As}{b \times d}$$

$$\rho = 0.0066$$

$$\rho \text{ min} = \frac{1,4}{fy}$$

$$= 0.004117647$$

$$\rho \text{ max} = 0,75 \times \rho \text{ bal}$$

$$= 0,75 \times \frac{0.85 fc'}{fy} \times \beta 1 \times \frac{600}{600 + fy}$$

$$= 0.031404255$$

ρ min < ρ < ρ max ..... Ok! (memenuhi syarat tulangan lemah)

No	fy	fc'	b	h	p	d'	n	ds	As	β1	ρ	ρmin	ρmaks	Ket.ρ	a	ϕMn
	(Mpa)	(Mpa)	(mm)	(mm)	(m)	(mm)	-	(mm)	(mm^2)				ρmin < ρ < ρmaks			(KN.m)
1	340	32.00	150	250	2	20	2	12	226	0.82	0.01	0.004	0.031	**OK**	2.74511	17.59

d. Kapasitas Momen

		Mu	=	Mn		
1/8 x q x l²	+	55	p	=	Cc	x (d - a/2)
		55	p	=	0.85 x fc' x b x a	x (d - a/2)
		55	p	=	11200.0528	x 21.6
		55	p	=	242,228.52	- 45
		55	p	=	242,183.52	
			p	=	4,403.34	
			2p	=	7,045.34	Kg

C. Penulangan Geser Balok

a. Gaya geser tumpuan

Vu = P
= 4403.3 Kg

b. Gaya geser yang disumbangkan beton

Vc = 1/6 √fc' x b x d
= 32526.91193 N
= 3319.07 kg

c. Syarat perlu tidaknya sengkang

Vc = 1320 kg

Vs max = 2/3 √fc' x b x d
= 130107.6477 N
= 13276.3 kg

Vu = 4403.3 kg < Φ Vc = 3319.07265 kg
< Vs max= 13276.2906 kg

e. Jarak Sengkang

Vs = Vu - Vc
= 3627.45

Digunakan sengkang Φ8 mm → As = 0.5 cm2
Fy = 240 Mpa
Av = 100 mm2

$$S = \frac{Av \times fy \times d}{Vs}$$

$$= \frac{100.48 \times 340 \times 230}{3627.454961}$$

= 2166.13 mm

S pakai = 30 cm

LAMPIRAN 4

BEBAN LENDUTAN

KODE : RC-N1

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4619						268	
2	100	0.050	4610	0.0818					262	0.00006
3	200	0.099	4601	0.1636					256	0.00012
4	300	0.149	4592	0.2455					251	0.00017
5	400	0.198	4585	0.3091					246	0.00022
6	500	0.248	4578	0.3727					239	0.00029
7	600	0.297	4571	0.4364					233	0.00035
8	700	0.347	4563	0.5091					227	0.00041
9	800	0.396	4555	0.5818					221	0.00047
10	900	0.446	4550	0.6273					213	0.00055
11	1000	0.495	4542	0.7000					206	0.00062
12	1100	0.545	4537	0.7455					199	0.00069
13	1200	0.594	4530	0.8091					178	0.00090
14	1300	0.644	4523	0.8727					163	0.00105
15	1400	0.693	4518	0.9182					159	0.00109
16	1500	0.743	4512	0.9727					152	0.00116
17	1600	0.792	4505	1.0364					142	0.00126
18	1700	0.842	4498	1.1000					131	0.00137
19	1800	0.891	4491	1.1636					123	0.00145
20	1900	0.941	4484	1.2273					115	0.00153
21	2000	0.990	4477	1.2909					103	0.00165
22	2100	1.040	4469	1.3636					91	0.00177
23	2200	1.089	4461	1.4364					79	0.00189
24	2300	1.139	4453	1.5091					69	0.00199
25	2400	1.188	4443	1.6000					50	0.00218
26	2500	1.238	4430	1.7182					36	0.00232
27	2600	1.287	4414	1.8636					21	0.00247
28	2700	1.337	4403	1.9636					7	0.00261
29	2800	1.386	4391	2.0727					0	0.00268
30	2900	1.436	4378	2.1909					-6	0.00274
31	3000	1.485	4365	2.3091					-21	0.00289
32	3100	1.535	4351	2.4364					-28	0.00296
33	3200	1.584	4337	2.5636					-47	0.00315
34	3300	1.634	4325	2.6727					-56	0.00324
35	3400	1.683	4312	2.7909					-62	0.00330
36	3500	1.733	4302	2.8818					-66	0.00334
37	3600	1.782	4291	2.9818					-79	0.00347
38	3700	1.832	4280	3.0818					-87	0.00355
39	3800	1.881	4270	3.1727					-92	0.00360
40	3900	1.931	4257	3.2909					-106	0.00374
41	4000	1.980	4246	3.3909					-116	0.00384
42	4100	2.030	4235	3.4909					-121	0.00389
43	4200	2.079	4225	3.5818					-129	0.00397
44	4300	2.129	4213	3.6909					-137	0.00405
45	4400	2.178	4201	3.8000					-141	0.00409
46	4500	2.228	4189	3.9091					-152	0.00420
47	4600	2.277	4178	4.0091					-158	0.00426
48	4700	2.327	4163	4.1455					-165	0.00433
49	4800	2.376	4153	4.2364					-172	0.00440
50	4900	2.426	4144	4.3182					-179	0.00447
51	5000	2.475	4132	4.4273					-185	0.00453
52	5100	2.525	4121	4.5273					-192	0.00460
53	5200	2.574	4112	4.6091					-200	0.00468
54	5300	2.624	4102	4.7000					-207	0.00475
55	5400	2.673	4095	4.7636					-209	0.00477
56	5500	2.723	4074	4.9545					-215	0.00483
57	5600	2.772	4056	5.1182					-223	0.00491
58	5700	2.822	4032	5.3364					-232	0.00500
59	5800	2.871	4011	5.5273					-242	0.00510
60	5900	2.921	3991	5.7091					-255	0.00523
61	6000	2.970	3972	5.8818					-267	0.00535
62	6100	3.020	3954	6.0455					-278	0.00546
63	6200	3.069	3932	6.2455					-289	0.00557
64	6250	3.094	3834	7.1364					-302	0.0057
65										
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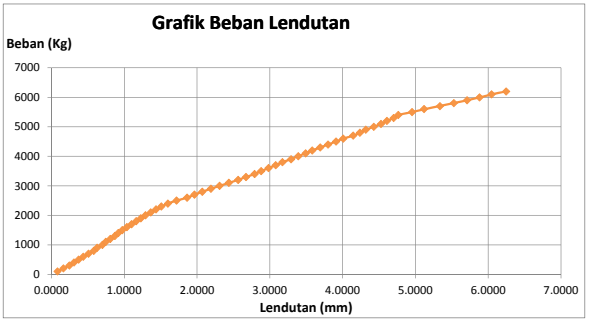

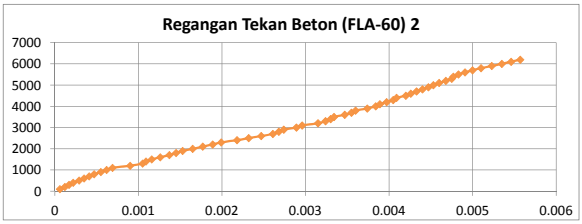

KODE : RC-N2

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4736						585	
2	300	0.149	4719	0.1545					570	0.00015
3	600	0.297	4706	0.2727					552	0.00033
4	900	0.446	4691	0.4091					539	0.00046
5	1200	0.594	4674	0.5636					523	0.00062
6	1500	0.743	4656	0.7273					505	0.00080
7	1800	0.891	4644	0.8364					488	0.00097
8	2100	1.040	4626	1.0000					473	0.00112
9	2400	1.188	4613	1.1182					454	0.00131
10	2700	1.337	4598	1.2545					433	0.00152
11	3000	1.485	4577	1.4455					410	0.00175
12	3300	1.634	4552	1.6727					392	0.00193
13	3600	1.782	4524	1.9273					376	0.00209
14	3900	1.931	4499	2.1545					357	0.00228
15	4200	2.079	4468	2.4364					346	0.00239
16	4500	2.228	4436	2.7273					329	0.00256
17	4800	2.376	4400	3.0545					306	0.00279
18	5100	2.525	4333	3.6636					282	0.00303
19	5400	2.673	4212	4.7636					259	0.00326
20	5700	2.822	4056	6.1818					233	0.00352
21	6000	2.970	3880	7.7818					211	0.00374
22	6100	3.020	3700	9.4182					195	0.0039
23	6050	2.995	3500	11.2364					177	0.00408
24	5900	2.921	3300	13.0545					161	0.00424
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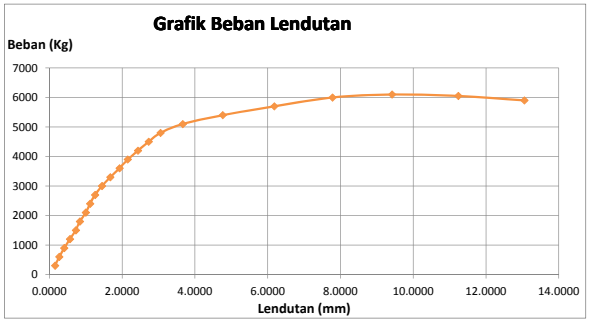

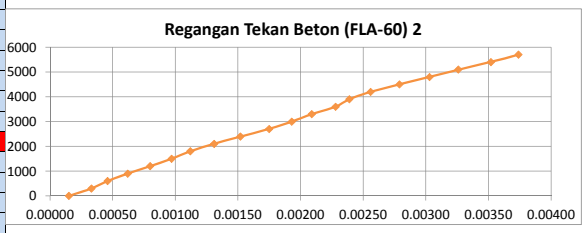

KODE : RC-N3

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4541						354	
2	200	0.099	4521	0.1818					346	0.00008
3	400	0.198	4505	0.3273					337	0.00017
4	600	0.297	4490	0.4636					327	0.00027
5	800	0.396	4477	0.5818					313	0.00041
6	1000	0.495	4464	0.7000					301	0.00053
7	1200	0.594	4451	0.8182					291	0.00063
8	1400	0.693	4439	0.9273					279	0.00075
9	1600	0.792	4429	1.0182					267	0.00087
10	1800	0.891	4416	1.1364					254	0.001
11	2000	0.990	4404	1.2455					239	0.00115
12	2200	1.089	4390	1.3727					225	0.00129
13	2400	1.188	4376	1.5000					208	0.00146
14	2600	1.287	4357	1.6727					179	0.00175
15	2800	1.386	4335	1.8727					160	0.00194
16	3000	1.485	4305	2.1455					143	0.00211
17	3200	1.584	4282	2.3545					130	0.00224
18	3400	1.683	4257	2.5818					114	0.0024
19	3600	1.782	4229	2.8364					98	0.00256
20	3800	1.881	4211	3.0000					84	0.0027
21	4000	1.980	4186	3.2273					74	0.0028
22	4200	2.079	4166	3.4091					61	0.00293
23	4400	2.178	4147	3.5818					49	0.00305
24	4600	2.277	4123	3.8000					38	0.00316
25	4800	2.376	4105	3.9636					30	0.00324
26	5000	2.475	4082	4.1727					18	0.00336
27	5200	2.574	4062	4.3545					8	0.00346
28	5400	2.673	4042	4.5364					0	0.00354
29	5600	2.772	4022	4.7182					-13	0.00367
30	5800	2.871	4003	4.8909					-23	0.00377
31	6000	2.970	3982	5.0818					-32	0.00386
32	6200	3.069	3961	5.2727					-28	0.00382
33	6350	3.143	3880	6.0091					28	0.00326
34	6100	3.020	3700	7.6455					279	0.00075
35	6050	2.995	3500	9.4636					712	-0.00358
36	0	0.000	3968	5.2091					1372	-0.01018
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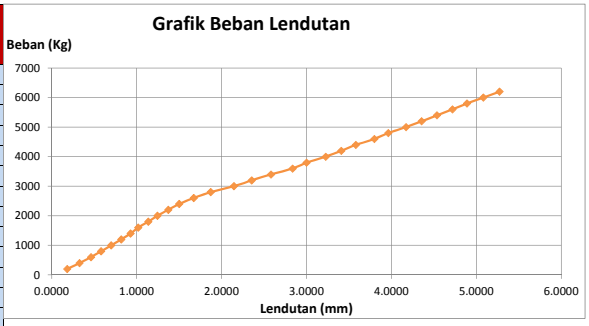

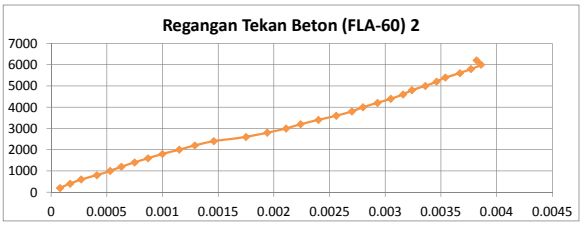

KODE : RC-N4

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4455						394	0
2	200	0.099	4438	0.1545					383	0.00011
3	400	0.198	4424	0.2818					373	0.00021
4	600	0.297	4412	0.3909					363	0.00031
5	800	0.396	4402	0.4818					351	0.00043
6	1000	0.495	4391	0.5818					335	0.00059
7	1200	0.594	4381	0.6727					328	0.00066
8	1400	0.693	4367	0.8000					319	0.00075
9	1600	0.792	4355	0.9091					307	0.00087
10	1800	0.891	4341	1.0364					293	0.00101
11	2000	0.990	4329	1.1455					278	0.00116
12	2200	1.089	4315	1.2727					264	0.0013
13	2400	1.188	4302	1.3909					249	0.00145
14	2600	1.287	4285	1.5455					222	0.00172
15	2800	1.386	4259	1.7818					188	0.00206
16	3000	1.485	4222	2.1182					158	0.00236
17	3200	1.584	4206	2.2636					140	0.00254
18	3400	1.683	4183	2.4727					119	0.00275
19	3600	1.782	4146	2.8091					102	0.00292
20	3800	1.881	4125	3.0000					82	0.00312
21	4000	1.980	4105	3.1818					65	0.00329
22	4200	2.079	4083	3.3818					47	0.00347
23	4400	2.178	4064	3.5545					31	0.00363
24	4600	2.277	4046	3.7182					17	0.00377
25	4800	2.376	4017	3.9818					-3	0.00397
26	5000	2.475	3999	4.1455					-15	0.00409
27	5200	2.574	3980	4.3182					-31	0.00425
28	5400	2.673	3960	4.5000					-45	0.00439
29	5600	2.772	3940	4.6818					-64	0.00458
30	5800	2.871	3918	4.8818					-83	0.00477
31	6000	2.970	3897	5.0727					-101	0.00495
32	6200	3.069	3865	5.3636					-138	0.00532
33	6250	3.094	3716	6.7182					-223	0.00617
34	6400	3.168	3600	7.7727					-280	0.00674
35	6300	3.119	3400	9.5909					-307	0.00701
36	6400	3.168	3300	10.5000					-323	0.00717
37	6500	3.218	3100	12.3182					-365	0.00759
38	6600	3.267	2900	14.1364					-432	0.00826
39	6450	3.193	2700	15.9545					-490	0.00884
40	6700	3.317	2500	17.7727					-528	0.00922
41	6732	3.332	2300	19.5909					-547	0.00941
42	6800	3.366	2100	21.4091					-568	0.00962
43	6600	3.267	1900	23.2273					-593	0.00987
44	6500	3.218	1700	25.0455					-610	0.01004
45	6400	3.168	1500	26.8636					-632	0.01026
46	6350	3.143	1300	28.6818					-651	0.01045
47	6300	3.119	1100	30.5000					-675	0.01069
48	6200	3.069	900	32.3182					-698	0.01092
49	6100	3.020	700	34.1364						
50	6150	3.044	500	35.9545						
51	6250	3.094	300	37.7727						
52	6350	3.143	100	39.5909						
53	6500	3.218	-100	41.4091						
54	6550	3.242	-300	43.2273						
55	6300	3.119	-500	45.0455						
56	6100	3.020	-700	46.8636						
57	6000	2.970	-900	48.6818						
58	5300	2.624	-1100	50.5000						
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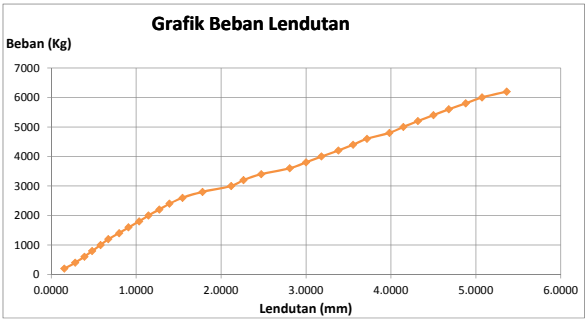

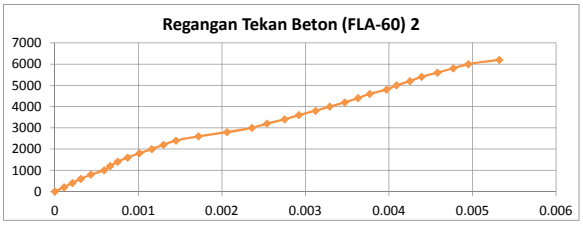

KODE : RC-N5

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4411						945	
2	200	0.099	4392	0.1727					935	0.0001
3	400	0.198	4379	0.2909					926	0.00019
4	600	0.297	4366	0.4091					916	0.00029
5	800	0.396	4354	0.5182					905	0.0004
6	1000	0.495	4344	0.6091					893	0.00052
7	1200	0.594	4334	0.7000					883	0.00062
8	1400	0.693	4324	0.7909					869	0.00076
9	1600	0.792	4314	0.8818					853	0.00092
10	1800	0.891	4302	0.9909					839	0.00106
11	2000	0.990	4291	1.0909					824	0.00121
12	2200	1.089	4281	1.1818					810	0.00135
13	2400	1.188	4268	1.3000					793	0.00152
14	2600	1.287	4256	1.4091					776	0.00169
15	2800	1.386	4242	1.5364					759	0.00186
16	3000	1.485	4210	1.8273					675	0.0027
17	3200	1.584	4187	2.0364					653	0.00292
18	3400	1.683	4154	2.3364					628	0.00317
19	3600	1.782	4128	2.5727					604	0.00341
20	3800	1.881	4105	2.7818					582	0.00363
21	4000	1.980	4082	2.9909					561	0.00384
22	4200	2.079	4056	3.2273					540	0.00405
23	4400	2.178	4039	3.3818					518	0.00427
24	4600	2.277	4018	3.5727					500	0.00445
25	4800	2.376	4000	3.7364					483	0.00462
26	5000	2.475	3978	3.9364					463	0.00482
27	5200	2.574	3960	4.1000					448	0.00497
28	5400	2.673	3942	4.2636					430	0.00515
29	5600	2.772	3922	4.4455					411	0.00534
30	5800	2.871	3904	4.6091					393	0.00552
31	6000	2.970	3885	4.7818					379	0.00566
32	6200	3.069	3861	5.0000					357	0.00588
33	6400	3.168	3834	5.2455					317	0.00628
34	6300	3.119	3532	7.9909					292	0.00653
35	6300	3.119	3300	10.1000					492	0.00453
36	6300	3.119	3100	11.9182					718	0.00227
37	6250	3.094	2900	13.7364					1008	-0.00063
38	6350	3.143	2700	15.5545					1226	-0.00281
39	6325	3.131	2500	17.3727					1202	-0.00257
40	6300	3.119	2300	19.1909					1201	-0.00256
41	6400	3.168	2100	21.0091					1352	-0.00407
42	6300	3.119	1700	24.6455					1553	-0.00608
43	6250	3.094	1500	26.4636					1569	-0.00624
44	6350	3.143	1300	28.2818					1787	-0.00842
45	6350	3.143	1100	30.1000					2039	-0.01094
46	6400	3.168	900	31.9182					2359	-0.01414
47	6350	3.143	700	33.7364					2608	-0.01663
48	6300	3.119	500	35.5545					2541	-0.01596
49	6350	3.143	300	37.3727					2510	-0.01565
50	6310	3.123	100	39.1909					2470	-0.01525
51	6400	3.168	-100	41.0091					2434	-0.01489
52	6450	3.193	-300	42.8273					2554	-0.01609
53	6300	3.119	-500	44.6455					2620	-0.01675
54	6400	3.168	-700	46.4636					2623	-0.01678
55	6450	3.193	-900	48.2818					2631	-0.01686
56	6500	3.218	-1100	50.1000					2620	-0.01675
57	5350	2.648	-1350	52.3727					-	
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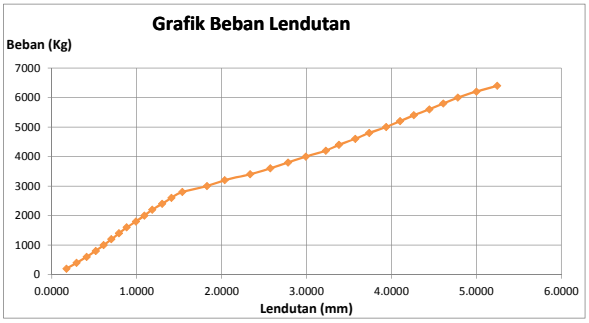

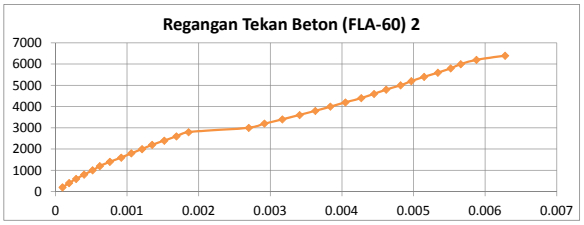

KODE : RC-N6

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4787				869		1275	
2	200	0.099	4768	0.1727			861	0.00008	1265	0.0001
3	400	0.198	4749	0.3455			854	0.00015	1254	0.00021
4	600	0.297	4737	0.4545			848	0.00021	1243	0.00032
5	800	0.396	4726	0.5545			840	0.00029	1233	0.00042
6	1000	0.495	4715	0.6545			833	0.00036	1222	0.00053
7	1200	0.594	4702	0.7727			825	0.00044	1210	0.00065
8	1400	0.693	4687	0.9091			818	0.00051	1198	0.00077
9	1600	0.792	4672	1.0455			808	0.00061	1184	0.00091
10	1800	0.891	4659	1.1636			801	0.00068	1167	0.00108
11	2000	0.990	4645	1.2909			789	0.0008	1153	0.00122
12	2200	1.089	4631	1.4182			778	0.00091	1133	0.00142
13	2400	1.188	4615	1.5636			764	0.00105	1106	0.00169
14	2600	1.287	4597	1.7273			747	0.00122	1069	0.00206
15	2800	1.386	4580	1.8818			729	0.0014	1029	0.00246
16	3000	1.485	4554	2.1182			702	0.00167	947	0.00328
17	3200	1.584	4529	2.3455			683	0.00186	883	0.00392
18	3400	1.683	4511	2.5091			672	0.00197	839	0.00436
19	3600	1.782	4483	2.7636			662	0.00207	793	0.00482
20	3800	1.881	4464	2.9364			652	0.00217	761	0.00514
21	4000	1.980	4439	3.1636			643	0.00226	732	0.00543
22	4200	2.079	4406	3.4636			636	0.00233	702	0.00573
23	4400	2.178	4383	3.6727			629	0.0024	680	0.00595
24	4600	2.277	4364	3.8455			625	0.00244	659	0.00616
25	4800	2.376	4344	4.0273			616	0.00253	637	0.00638
26	5000	2.475	4325	4.2000			609	0.0026	616	0.00659
27	5200	2.574	4299	4.4364			604	0.00265	597	0.00678
28	5400	2.673	4280	4.6091			598	0.00271	575	0.007
29	5600	2.772	4261	4.7818			592	0.00277	553	0.00722
30	5800	2.871	4243	4.9455			586	0.00283	532	0.00743
31	6000	2.970	4221	5.1455			578	0.00291	509	0.00766
32	6200	3.069	4203	5.3091			573	0.00296	489	0.00786
33	6400	3.168	4182	5.5000			574	0.00295	460	0.00815
34	6600	3.267	4159	5.7091			587	0.00282	330	0.00945
35	6800	3.366	3928	7.8091			971	-0.00102	-182	0.01457
36	7000	3.465	3810	8.8818			1051	-0.00182	-327	0.01602
37	6800	3.366	3600	10.7909			1165	-0.00296	-564	0.01839
38	7100	3.515	3200	14.4273			1202	-0.00333	-682	0.01957
39	7160	3.544	2800	18.0636			1211	-0.00342	-774	0.02049
40	7300	3.614	2400	21.7000			1218	-0.00349	-805	0.0208
41	7300	3.614	2000	25.3364			1241	-0.00372	-900	0.02175
42	7320	3.623	1600	28.9727			1257	-0.00388	-943	0.02218
43	7400	3.663	1200	32.6091			1381	-0.00512	-1115	0.0239
44	7280	3.604	1000	34.4273			1442	-0.00573	-1194	0.02469
45	7500	3.713	600	38.0636			1615	-0.00746	-1345	0.0262
46	7380	3.653	200	41.7000			1638	-0.00769	-1400	0.02675
47	7260	3.594	-200	45.3364			1701	-0.00832	-1418	0.02693
48	7420	3.673	-600	48.9727			1715	-0.00846	-1492	0.02767
49	7660	3.792	-1000	52.6091			1726	-0.00857	-1515	0.0279
50	7450	3.688	-1400	56.2455			1734	-0.00865	-1523	0.02798
51	7423	3.674	-1800	59.8818			1738	-0.00869	-1552	0.02827
52	7310	3.618	-2200	63.5182			-		-	
53	5670	2.807	-2600	67.1545			-		-	
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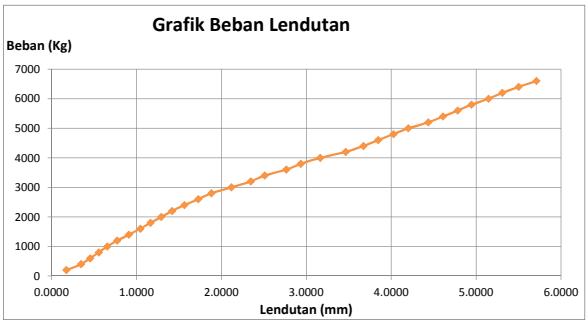

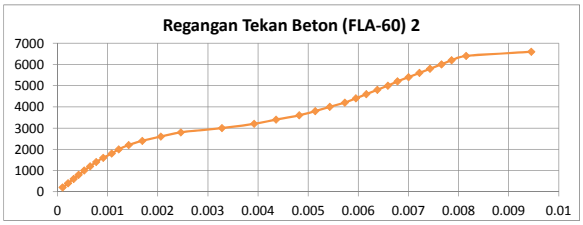

KODE : RC-N7

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4822		938		275		999	
2	200	0.099	4785	0.3364	942	0.00004	264	0.00011	985	0.00014
3	400	0.198	4782	0.3636	946	0.00008	260	0.00015	977	0.00022
4	600	0.297	4764	0.5273	950	0.00012	249	0.00026	965	0.00034
5	800	0.396	4751	0.6455	953	0.00015	240	0.00035	953	0.00046
6	1000	0.495	4738	0.7636	956	0.00018	231	0.00044	941	0.00058
7	1200	0.594	4727	0.8636	959	0.00021	222	0.00053	928	0.00071
8	1400	0.693	4711	1.0091	961	0.00023	211	0.00064	912	0.00087
9	1600	0.792	4698	1.1273	966	0.00028	202	0.00073	897	0.00102
10	1800	0.891	4682	1.2727	966	0.00028	190	0.00085	880	0.00119
11	2000	0.990	4666	1.4182	970	0.00032	174	0.00101	861	0.00138
12	2200	1.089	4653	1.5364	970	0.00032	163	0.00112	840	0.00159
13	2400	1.188	4639	1.6636	974	0.00036	150	0.00125	820	0.00179
14	2600	1.287	4623	1.8091	990	0.00052	136	0.00139	786	0.00213
15	2800	1.386	4590	2.1091	1014	0.00076	114	0.00161	742	0.00257
16	3000	1.485	4562	2.3636	1030	0.00092	93	0.00182	689	0.0031
17	3200	1.584	4538	2.5818	1059	0.00121	76	0.00199	654	0.00345
18	3400	1.683	4512	2.8182	1109	0.00171	63	0.00212	625	0.00374
19	3600	1.782	4482	3.0909	1177	0.00239	46	0.00229	597	0.00402
20	3800	1.881	4425	3.6091	1232	0.00294	35	0.0024	567	0.00432
21	4000	1.980	4403	3.8091	1271	0.00333	28	0.00247	543	0.00456
22	4200	2.079	4383	3.9909	1300	0.00362	19	0.00256	519	0.0048
23	4400	2.178	4362	4.1818	1335	0.00397	10	0.00265	496	0.00503
24	4600	2.277	4329	4.4818	1361	0.00423	3	0.00272	478	0.00521
25	4800	2.376	4303	4.7182	1379	0.00441	-9	0.00284	455	0.00544
26	5000	2.475	4280	4.9273	1398	0.00460	-18	0.00293	434	0.00565
27	5200	2.574	4259	5.1182	1412	0.00474	-26	0.00301	414	0.00585
28	5400	2.673	4237	5.3182	1432	0.00494	-36	0.00311	394	0.00605
29	5600	2.772	4216	5.5091	1449	0.00511	-45	0.0032	372	0.00627
30	5800	2.871	4194	5.7091	1499	0.00561	-50	0.00325	352	0.00647
31	6000	2.970	4164	5.9818	1573	0.00635	-51	0.00326	333	0.00666
32	6200	3.069	4078	6.7636	1617	0.00679	-51	0.00326	303	0.00696
33	6400	3.168	3901	8.3727	1612	0.00674	-71	0.00346	201	0.00798
34	6600	3.267	3333	13.5364	1171	0.00233	604	-0.00329	118	0.00881
35	6375.5	3.156	3000	16.5636	1119	0.00181	1315	-0.0104	-637	0.01636
36	6469	3.202	2600	20.2000	1216	0.00278	1904	-0.01629	-936	0.01935
37	6575.5	3.255	2200	23.8364	1148	0.00210	2459	-0.02184	-1143	0.02142
38	6643	3.288	1800	27.4727	1140	0.00202	2774	-0.02499	-1227	0.02226
39	6742.5	3.338	1400	31.1091	1127	0.00189	3288	-0.03013	-1418	0.02417
40	6821.5	3.377	1000	34.7455	1152	0.00214	4627	-0.04352	-1578	0.02577
41	6839	3.385	600	38.3818	1158	0.00220	5203	-0.04928	-1739	0.02738
42	7018	3.474	200	42.0182	1136	0.00198	5548	-0.05273	-1979	0.02978
43	7065	3.497	-200	45.6545	1121	0.00183	5893	-0.05618	-2148	0.03147
44	7109	3.519	-600	49.2909	1129	0.00191	6931	-0.06656	-2299	0.03298
45	7116.5	3.523	-1000	52.9273	1130	0.00192	7313	-0.07038	-2299	0.03298
46	6850	3.391	-1400	56.5636	1119	0.00181	7527	-0.07252	-2339	0.03338
47	6600	3.267	-1800	60.2000	1109	0.00171	8128	-0.07853	-2302	0.03301
48	6320	3.128	-2200	63.8364	1072	0.00134	8692	-0.08417	-2123	0.03122
49	6100	3.020	-2600	67.4727	1054	0.00116	8962	-0.08687	-2863	0.03862
50	5940	2.940	-3100	72.0182	1030	0.00092	8155	-0.0788	-2349	0.03348
51	0	0.000	-1957	61.6273	1021	0.00083	11609	-0.11334	-977	0.01976
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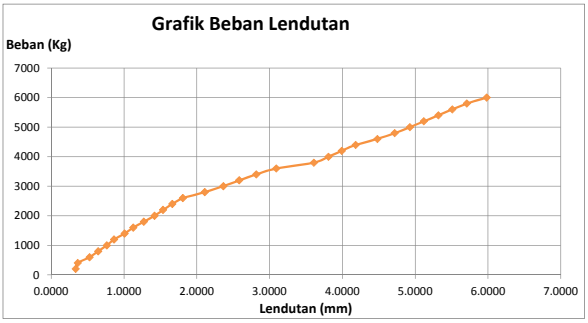

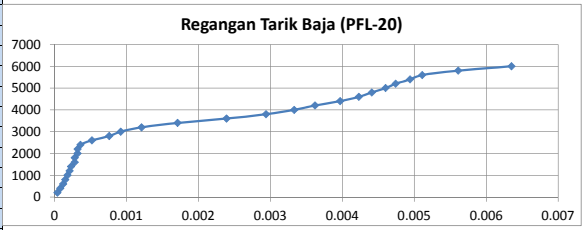

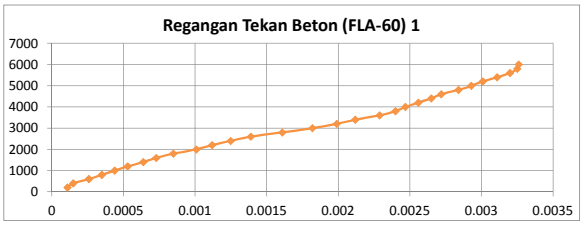

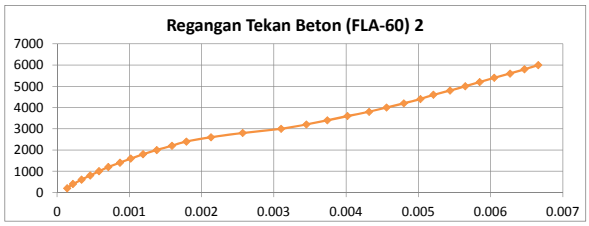

KODE : RC-N8

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4750		990		994		785	
2	200	0.099	4730	0.1818	993	0.00003	987	0.00007	784	0.00001
3	400	0.198	4713	0.3364	996	0.00006	979	0.00015	778	0.00007
4	600	0.297	4697	0.4818	1001	0.00011	971	0.00023	768	0.00017
5	800	0.396	4685	0.5909	1009	0.00019	961	0.00033	759	0.00026
6	1000	0.495	4674	0.6909	1014	0.00024	954	0.00040	751	0.00034
7	1200	0.594	4663	0.7909	1023	0.00033	945	0.00049	742	0.00043
8	1400	0.693	4652	0.8909	1033	0.00043	936	0.00058	730	0.00055
9	1600	0.792	4640	1.0000	1038	0.00048	925	0.00069	720	0.00065
10	1800	0.891	4628	1.1091	1056	0.00066	915	0.00079	707	0.00078
11	2000	0.990	4613	1.2455	1146	0.00156	888	0.00106	673	0.00112
12	2200	1.089	4598	1.3818	1334	0.00344	863	0.00131	645	0.00140
13	2400	1.188	4581	1.5364	1666	0.00676	821	0.00173	585	0.00200
14	2600	1.287	4490	2.3636	1910	0.00920	793	0.00201	539	0.00246
15	2800	1.386	4470	2.5455	2063	0.01073	760	0.00234	482	0.00303
16	3000	1.485	4448	2.7455	2158	0.01168	740	0.00254	448	0.00337
17	3200	1.584	4412	3.0727	2350	0.01360	716	0.00278	324	0.00461
18	3400	1.683	4331	3.8091	2447	0.01457	698	0.00296	285	0.00500
19	3600	1.782	4308	4.0182	2526	0.01536	684	0.00310	249	0.00536
20	3800	1.881	4282	4.2545	2650	0.01660	668	0.00326	207	0.00578
21	4000	1.980	4262	4.4364	2756	0.01766	657	0.00337	170	0.00615
22	4200	2.079	4243	4.6091	2859	0.01869	645	0.00349	134	0.00651
23	4400	2.178	4223	4.7909	2934	0.01944	631	0.00363	100	0.00685
24	4600	2.277	4203	4.9727	3005	0.02015	618	0.00376	66	0.00719
25	4800	2.376	4181	5.1727	3093	0.02103	604	0.00390	33	0.00752
26	5000	2.475	4162	5.3455	3202	0.02212	591	0.00403	1	0.00784
27	5200	2.574	4143	5.5182	3264	0.02274	577	0.00417	-31	0.00816
28	5400	2.673	4124	5.6909	3347	0.02357	564	0.00430	-64	0.00849
29	5600	2.772	4104	5.8727	3397	0.02407	549	0.00445	-96	0.00881
30	5800	2.871	4085	6.0455	3466	0.02476	537	0.00457	-131	0.00916
31	6000	2.970	4064	6.2364	3566	0.02576	532	0.00462	-172	0.00957
32	6200	3.069	4039	6.4636	920	-0.00070	574	0.00420	-363	0.01148
33	6200	3.069	3874	7.9636	863	-0.00127	752	0.00242	-779	0.01564
34	6233	3.085	3500	11.3636	902	-0.00088	2138	-0.01144	-1806	0.02591
35	6300	3.119	3100	15.0000	926	-0.00064	3746	-0.02752	-2456	0.03241
36	6493	3.214	2500	20.4545	937	-0.00053	4361	-0.03367	-2690	0.03475
37	6589	3.262	2100	24.0909	935	-0.00055	4594	-0.03600	-2815	0.03600
38	6600	3.267	1700	27.7273	856	-0.00134	6441	-0.05447	-3917	0.04702
39	6650	3.292	1300	31.3636	724	-0.00266	8472	-0.07478	-3031	0.03816
40	6785	3.359	900	35.0000	678	-0.00312	8943	-0.07949	-3084	0.03869
41	6748	3.340	500	38.6364	601	-0.00389	9688	-0.08694	-2876	0.03661
42	6800	3.366	100	42.2727	565	-0.00425	10563	-0.09569	-2843	0.03628
43	6929	3.430	-300	45.9091	506	-0.00484	11162	-0.10168	-2706	0.03491
44	6939	3.435	-700	49.5455	505	-0.00485	11005	-0.10011	-2623	0.03408
45	6973	3.452	-1100	53.1818	514	-0.00476	11057	-0.10063	-2656	0.03441
46	6993	3.462	-1500	56.8182	331	-0.00659	11409	-0.10415	-2455	0.03240
47	7095	3.512	-1900	60.4545	414	-0.00576	6331	-0.05337	-657	0.01442
48	5996	2.968	-2347	64.5182	457	-0.00533	5339	-0.04345	-472	0.01257
49	0	0.000	1427	30.2091	482	-0.00508	7703	-0.06709	-354	0.01139
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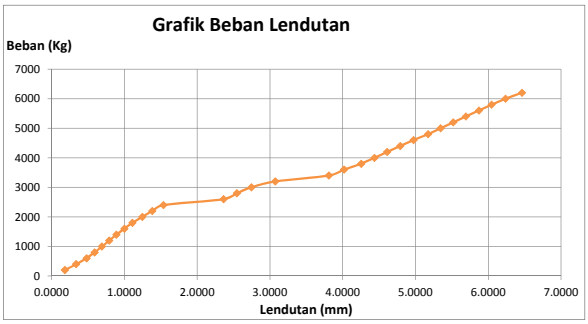

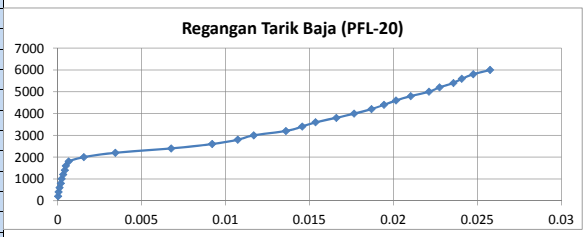

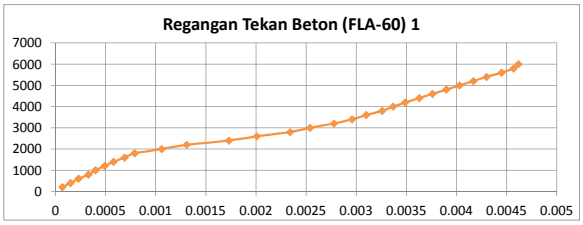

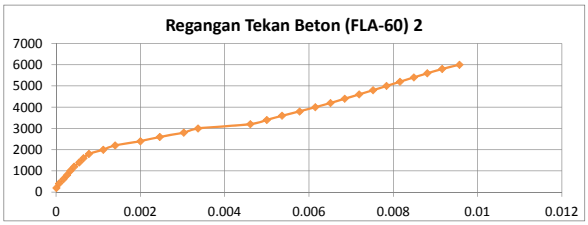

KODE : RC-N9

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	4628		802		558		1458	
2	203	0.100	4615	0.1182	809	0.00007	551	0.00007	1447	0.00011
3	405	0.200	4603	0.2273	816	0.00014	543	0.00015	1436	0.00022
4	613	0.303	4593	0.3182	825	0.00023	535	0.00023	1425	0.00033
5	802	0.397	4583	0.4091	835	0.00033	527	0.00031	1413	0.00045
6	1003	0.496	4574	0.4909	844	0.00042	520	0.00038	1401	0.00057
7	1201	0.594	4565	0.5727	855	0.00053	510	0.00048	1390	0.00068
8	1402	0.694	4554	0.6727	864	0.00062	499	0.00059	1376	0.00082
9	1604	0.794	4543	0.7727	875	0.00073	490	0.00068	1362	0.00096
10	1802	0.892	4532	0.8727	893	0.00091	483	0.00075	1347	0.00111
11	2000	0.990	4520	0.9818	912	0.00110	474	0.00084	1331	0.00127
12	2202	1.090	4507	1.1000	954	0.00152	460	0.00098	1310	0.00148
13	2402	1.189	4491	1.2455	1032	0.00230	451	0.00107	1275	0.00183
14	2603	1.288	4478	1.3636	1191	0.00389	437	0.00121	1253	0.00205
15	2800	1.386	4451	1.6091	1563	0.00761	389	0.00169	1161	0.00297
16	3000	1.485	4430	1.8000	1665	0.00863	373	0.00185	1125	0.00333
17	3200	1.584	4383	2.2273	1761	0.00959	352	0.00206	1079	0.00379
18	3400	1.683	4370	2.3455	1853	0.01051	343	0.00215	1052	0.00406
19	3600	1.782	4342	2.6000	1960	0.01158	331	0.00227	1022	0.00436
20	3806	1.884	4320	2.8000	2056	0.01254	320	0.00238	993	0.00465
21	4012	1.986	4302	2.9636	2160	0.01358	309	0.00249	966	0.00492
22	4201	2.079	4275	3.2091	2266	0.01464	299	0.00259	939	0.00519
23	4418	2.187	4250	3.4364	2371	0.01569	289	0.00269	911	0.00547
24	4612	2.283	4231	3.6091	2456	0.01654	282	0.00276	887	0.00571
25	4807	2.379	4209	3.8091	2556	0.01754	273	0.00285	859	0.00599
26	5010	2.480	4181	4.0636	2648	0.01846	264	0.00294	831	0.00627
27	5225	2.586	8780	4.3931	2729	0.01927	257	0.00301	805	0.00653
28	5403	2.674	8734	4.6066	2816	0.02014	243	0.00315	776	0.00682
29	5602	2.773	8695	4.7875	2897	0.02095	233	0.00325	749	0.00709
30	5803	2.872	8650	4.9964	2984	0.02182	228	0.00330	726	0.00732
31	6005	2.972	8610	5.1820	3067	0.02265	220	0.00338	701	0.00757
32	6217	3.077	8561	5.4093	3156	0.02354	217	0.00341	686	0.00772
33	6384	3.160	8460	6.1215	3158	0.02356	232	0.00326	678	0.00780
34	6400	3.168	8077	8.1373	3213	0.02411	221	0.00337	667	0.00791
35	6369	3.153	7700	10.1215	3148	0.02346	203	0.00355	577	0.00881
36	6550	3.242	7300	12.2268	3178	0.02376	193	0.00365	406	0.01052
37	6511	3.223	6900	14.3321	3154	0.02352	218	0.00340	355	0.01103
38	6711	3.322	6500	16.4373	3169	0.02367	229	0.00329	203	0.01255
39	6800	3.366	6100	18.5426	3003	0.02201	247	0.00311	66	0.01392
40	6680	3.307	5700	20.6478	2070	0.01268	924	-0.00366	-419	0.01877
41	6598	3.266	5300	22.7531	1690	0.00888	1137	-0.00579	-936	0.02394
42	6669	3.301	4900	24.8584	1580	0.00778	1440	-0.00882	-1301	0.02759
43	6759	3.346	4500	26.9636	1357	0.00555	1554	-0.00996	-1531	0.02989
44	6905	3.418	4100	29.0689	1323	0.00521	1663	-0.01105	-1713	0.03171
45	6814	3.373	3700	31.1742	1334	0.00532	1902	-0.01344	-2009	0.03467
46	6886	3.409	3300	33.2794	1317	0.00515	1966	-0.01408	-2217	0.03675
47	6850	3.391	2900	35.3847	1391	0.00589	1949	-0.01391	-2384	0.03842
48	6780	3.356	2500	37.4900	1322	0.00520	1929	-0.01371	-2605	0.04063
49	6850	3.391	2100	39.5952	1282	0.00480	1872	-0.01314	-2825	0.04283
50	6740	3.336	1700	41.7005	1353	0.00551	1769	-0.01211	-2969	0.04427
51	6892	3.412	1300	43.8057	1463	0.00661	1335	-0.00777	-2513	0.03971
52	6912	3.421	900	45.9110	1605	0.00803	1035	-0.00477	-2382	0.03840
53	6892	3.412	500	48.0163	1539	0.00737	1134	-0.00576	-1343	0.02801
54	6890	3.411	100	50.1215	1463	0.00661	2039	-0.01481	-980	0.02438
55	6928	3.429	-300	52.2268	1406	0.00604	2640	-0.02082	-888	0.02346
56	6902	3.416	-700	54.3321	1408	0.00606	3086	-0.02528	-683	0.02141
57	2661	1.317	-1100	56.4373	3086	0.02284	20	0.00538	-	
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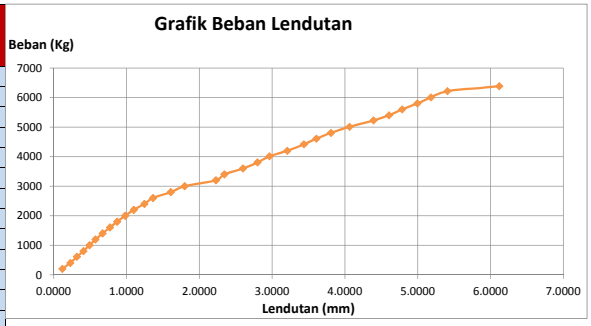

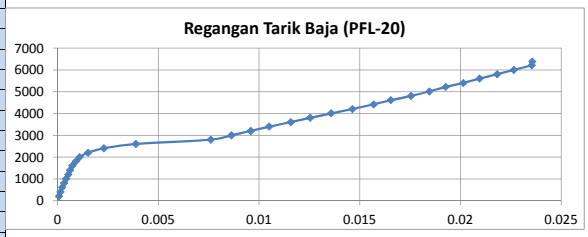

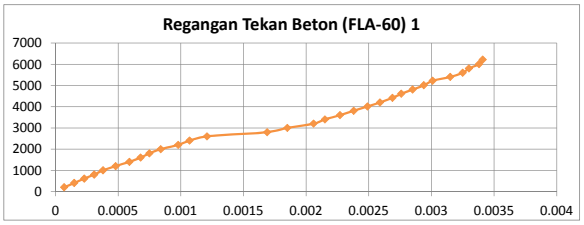

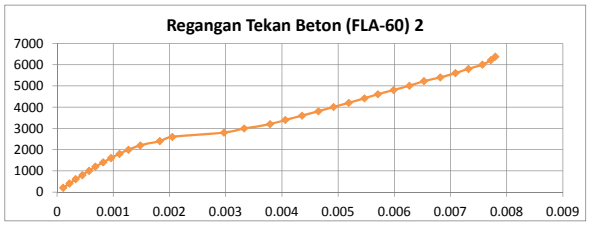

KODE : RC-N10

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	9491		805		933		80	
2	196	0.097	9464	0.1421	808	0.00003	927	0.00006	71	0.00009
3	400	0.198	9436	0.2895	811	0.00006	920	0.00013	62	0.00018
4	597	0.296	9413	0.4105	815	0.00010	913	0.00020	53	0.00027
5	793	0.393	9392	0.5211	819	0.00014	907	0.00026	43	0.00037
6	995	0.493	9371	0.6316	823	0.00018	900	0.00033	35	0.00045
7	1200	0.594	9348	0.7526	825	0.00020	892	0.00041	24	0.00056
8	1400	0.693	9328	0.8579	829	0.00024	885	0.00048	14	0.00066
9	1600	0.792	9307	0.9684	836	0.00031	878	0.00055	4	0.00076
10	1800	0.891	9284	1.0895	843	0.00038	864	0.00069	-16	0.00096
11	2002	0.991	9259	1.2211	848	0.00043	858	0.00075	-32	0.00112
12	2200	1.089	9238	1.3316	853	0.00048	848	0.00085	-45	0.00125
13	2400	1.188	9211	1.4737	860	0.00055	838	0.00095	-63	0.00143
14	2600	1.287	9174	1.6684	869	0.00064	818	0.00115	-96	0.00176
15	2800	1.386	9144	1.8263	881	0.00076	804	0.00129	-125	0.00205
16	3054	1.512	9124	1.9316	969	0.00164	795	0.00138	-166	0.00246
17	3204	1.586	9106	2.0263	1386	0.00581	788	0.00145	-185	0.00265
18	3400	1.683	9087	2.1263	1703	0.00898	781	0.00152	-212	0.00292
19	3600	1.782	9066	2.2368	1865	0.01060	775	0.00158	-241	0.00321
20	3800	1.881	9048	2.3316	1876	0.01071	768	0.00165	-265	0.00345
21	4000	1.980	9029	2.4316	1883	0.01078	759	0.00174	-287	0.00367
22	4200	2.079	9012	2.5211	1890	0.01085	751	0.00182	-309	0.00389
23	4400	2.178	8991	2.6316	1896	0.01091	744	0.00189	-329	0.00409
24	4600	2.277	8969	2.7474	1905	0.01100	736	0.00197	-351	0.00431
25	4800	2.376	8951	2.8421	1910	0.01105	728	0.00205	-372	0.00452
26	5000	2.475	8934	2.9316	1914	0.01109	720	0.00213	-391	0.00471
27	5200	2.574	8918	3.0158	1918	0.01113	712	0.00221	-410	0.00490
28	5400	2.673	8901	3.1053	1923	0.01118	704	0.00229	-430	0.00510
29	5600	2.772	8878	3.2263	1928	0.01123	696	0.00237	-450	0.00530
30	5800	2.871	8856	3.3421	1933	0.01128	688	0.00245	-470	0.00550
31	6000	2.970	8840	3.4263	1941	0.01136	681	0.00252	-491	0.00571
32	6200	3.069	8822	3.5211	1946	0.01141	670	0.00263	-509	0.00589
33	6400	3.168	8789	3.6947	1951	0.01146	662	0.00271	-528	0.00608
34	6589	3.262	8577	4.8105	1960	0.01155	665	0.00268	-575	0.00655
35	6420	3.178	8200	6.7947	1975	0.01170	773	0.00160	-762	0.00842
36	6460	3.198	7800	8.9000	1921	0.01116	779	0.00154	-812	0.00892
37	6560	3.247	7400	11.0053	2411	0.01606	771	0.00162	-829	0.00909
38	6680	3.307	7000	13.1105	1976	0.01171	760	0.00173	-848	0.00928
39	6646	3.290	6560	15.4263	1955	0.01150	758	0.00175	-813	0.00893
40	6660	3.297	6200	17.3211	1762	0.00957	744	0.00189	-803	0.00883
41	6710	3.321	5800	19.4263	1525	0.00720	741	0.00192	-802	0.00882
42	6680	3.307	5400	21.5316	936	0.00131	747	0.00186	-797	0.00877
43	6665	3.299	5000	23.6368	750	-0.00055	761	0.00172	-794	0.00874
44	6690	3.312	4600	25.7421	380	-0.00425	777	0.00156	-807	0.00887
45	6930	3.430	4200	27.8474	629	-0.00176	773	0.00160	-810	0.00890
46	7007	3.468	3800	29.9526	966	0.00161	770	0.00163	-808	0.00888
47	7003	3.466	3400	32.0579	1148	0.00343	766	0.00167	-811	0.00891
48	7080	3.505	3000	34.1632	1391	0.00586	773	0.00160	-800	0.00880
49	7006	3.468	2600	36.2684	1395	0.00590	762	0.00171	-796	0.00876
50	7190	3.559	2200	38.3737	1388	0.00583	757	0.00176	-775	0.00855
51	7200	3.564	1800	40.4789	1475	0.00670	752	0.00181	775	-0.00695
52	7170	3.549	1400	42.5842	1501	0.00696	749	0.00184	-767	0.00847
53	7238	3.583	1000	44.6895	1543	0.00738	735	0.00198	-765	0.00845
54	7295	3.611	600	46.7947	1883	0.01078	727	0.00206	-767	0.00847
55	7385	3.656	200	48.9000	2046	0.01241	721	0.00212	-761	0.00841
56	7454	3.690	-200	51.0053	2000	0.01195	717	0.00216	-767	0.00847
57	7512	3.718	-600	53.1105	1925	0.01120	711	0.00222	-782	0.00862
58	7568	3.746	-1000	55.2158	1919	0.01114	705	0.00228	-802	0.00882
59	7452	3.689	-1400	57.3211	2177	0.01372	706	0.00227	-866	0.00946
60	7502	3.713	-1800	59.4263	2417	0.01612	712	0.00221	-888	0.00968
61	7592	3.758	-2200	61.5316	2347	0.01542	710	0.00223	-894	0.00974
62	7572	3.748	-2600	63.6368	2371	0.01566	704	0.00229	-914	0.00994
63	7510	3.717	-3000	65.7421	2324	0.01519	704	0.00229	-943	0.01023
64	7660	3.792	-3400	67.8474	2314	0.01509	700	0.00233	-963	0.01043
65	7660	3.792	-3800	69.9526	2726	0.01921	700	0.00233	-977	0.01057
66	6200	3.069	-4000	71.0053						
67	0	0.000	-1814	59.5000						
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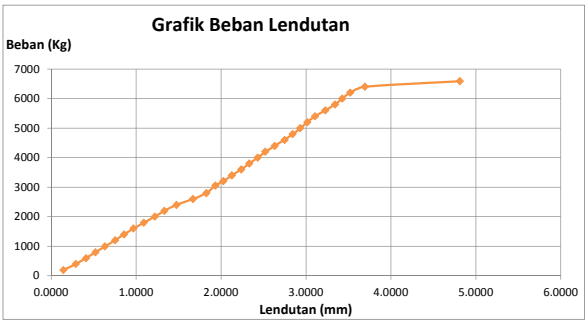

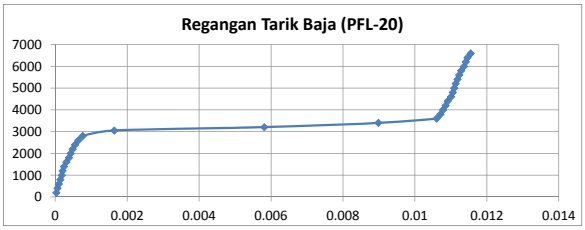

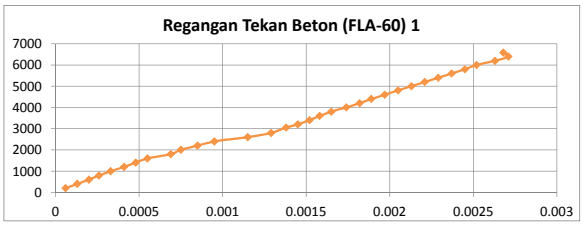

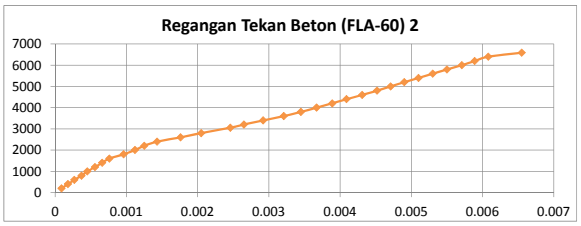

KODE : RC-O1

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	9251						721	
2	200	0.099	9241	0.0526					710	0.00011
3	400	0.198	9209	0.2211					699	0.00022
4	600	0.297	9183	0.3579					688	0.00033
5	800	0.396	9162	0.4684					677	0.00044
6	1000	0.495	9142	0.5737					665	0.00056
7	1200	0.594	9128	0.6474					654	0.00067
8	1400	0.693	9112	0.7316					641	0.00080
9	1600	0.792	9097	0.8105					630	0.00091
10	1800	0.891	9078	0.9105					617	0.00104
11	2000	0.990	9056	1.0263					602	0.00119
12	2200	1.089	9036	1.1316					584	0.00137
13	2400	1.188	9004	1.3000					539	0.00182
14	2600	1.287	8927	1.7053					475	0.00246
15	2800	1.386	8835	2.1895					414	0.00307
16	3000	1.485	8784	2.4579					389	0.00332
17	3200	1.584	8739	2.6947					365	0.00356
18	3400	1.683	8699	2.9053					342	0.00379
19	3600	1.782	8656	3.1316					319	0.00402
20	3800	1.881	8575	3.5579					299	0.00422
21	4000	1.980	8514	3.8789					281	0.00440
22	4200	2.079	8465	4.1368					257	0.00464
23	4400	2.178	8424	4.3526					236	0.00485
24	4600	2.277	8380	4.5842					214	0.00507
25	4800	2.376	8336	4.8158					193	0.00528
26	5000	2.475	8284	5.0895					172	0.00549
27	5200	2.574	8234	5.3526					148	0.00573
28	5400	2.673	8179	5.6421					127	0.00594
29	5600	2.772	8123	5.9368					103	0.00618
30	5800	2.871	7905	7.0842					-23	0.00744
31	6000	2.970	7644	8.4579					-141	0.00862
32	6200	3.069	7320	10.1632					-237	0.00958
33	6328	3.132	6545	14.2421					-476	0.01197
34	6100	3.020	6200	16.0579					-692	0.01413
35	6293	3.115	5800	18.1632					-896	0.01617
36	6350	3.143	5400	20.2684					-1027	0.01748
37	6329	3.133	5000	22.3737					-1337	0.02058
38	6438.5	3.187	4560	24.6895					-1514	0.02235
39	6505	3.220	4200	26.5842					-1575	0.02296
40	6403	3.169	3800	28.6895					-1574	0.02295
41	6449	3.192	3400	30.7947					-1617	0.02338
42	6548.5	3.242	3000	32.9000					-1676	0.02397
43	6560	3.247	2600	35.0053					-1704	0.02425
44	6595.5	3.265	2200	37.1105					-1752	0.02473
45	6628.5	3.281	1800	39.2158					-1845	0.02566
46	6705	3.319	1400	41.3211					-1956	0.02677
47	6726	3.329	1000	43.4263					-1979	0.02700
48	6818	3.375	600	45.5316					-2050	0.02771
49	6594.5	3.264	200	47.6368					-2025	0.02746
50	6829.5	3.381	-200	49.7421					-2045	0.02766
51	6809	3.370	-600	51.8474					-2059	0.02780
52	6918	3.424	-1000	53.9526					-2085	0.02806
53	6949	3.440	-1400	56.0579					-2072	0.02793
54	6904	3.417	-1800	58.1632					-2080	0.02801
55	7010	3.470	-2200	60.2684					-2091	0.02812
56	5851	2.896	-2600	62.3737					-	
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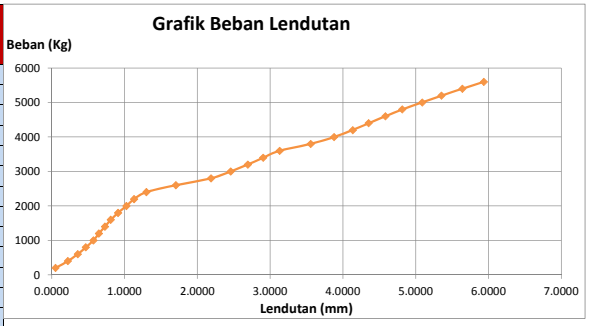

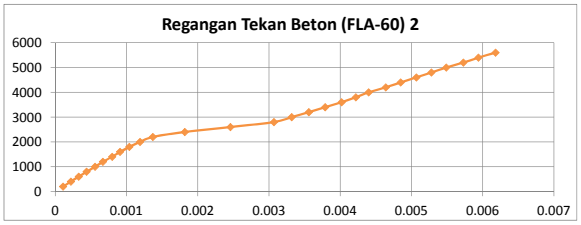

KODE : RC-O2

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	9048						1140	
2	200	0.099	9017	0.1632					1130	0.00010
3	400	0.198	8979	0.3632					1119	0.00021
4	600	0.297	8951	0.5105					1109	0.00031
5	800	0.396	8929	0.6263					1097	0.00043
6	1000	0.495	8907	0.7421					1087	0.00053
7	1200	0.594	8886	0.8526					1076	0.00064
8	1400	0.693	8856	1.0105					1065	0.00075
9	1600	0.792	8830	1.1474					1054	0.00086
10	1800	0.891	8811	1.2474					1043	0.00097
11	2000	0.990	8790	1.3579					1031	0.00109
12	2200	1.089	8766	1.4842					1015	0.00125
13	2400	1.188	8742	1.6105					998	0.00142
14	2600	1.287	8695	1.8579					964	0.00176
15	2800	1.386	8638	2.1579					915	0.00225
16	3000	1.485	8612	2.2947					867	0.00273
17	3200	1.584	8538	2.6842					817	0.00323
18	3400	1.683	8481	2.9842					789	0.00351
19	3600	1.782	8452	3.1368					764	0.00376
20	3800	1.881	8413	3.3421					737	0.00403
21	4000	1.980	8374	3.5474					715	0.00425
22	4200	2.079	8358	3.6316					695	0.00445
23	4498	2.227	8348	3.6842					663	0.00477
24	4600	2.277	8323	3.8158					651	0.00489
25	4800	2.376	8284	4.0211					628	0.00512
26	5000	2.475	8246	4.2211					610	0.00530
27	5200	2.574	8197	4.4789					584	0.00556
28	5400	2.673	8165	4.6474					568	0.00572
29	5600	2.772	8109	4.9421					546	0.00594
30	5800	2.871	8050	5.2526					523	0.00617
31	6000	2.970	8015	5.4368					502	0.00638
32	6200	3.069	7979	5.6263					479	0.00661
33	6400	3.168	7937	5.8474					457	0.00683
34	6600	3.267	7889	6.1000					435	0.00705
35	6650	3.292	7540	7.9368					412	0.00728
36	6862	3.397	7100	10.2526					293	0.00847
37	6830	3.381	6700	12.3579					71	0.01069
38	7001	3.465	6300	14.4632					-6	0.01146
39	6490	3.213	5900	16.5684					-12	0.01152
40	6680	3.307	5500	18.6737					-36	0.01176
41	6810	3.371	5100	20.7789					-31	0.01171
42	6767	3.350	4700	22.8842					-51	0.01191
43	6710	3.321	4300	24.9895					-64	0.01204
44	6769	3.351	3900	27.0947					-170	0.01310
45	6800	3.366	3500	29.2000					-450	0.01590
46	6870	3.401	3100	31.3053					-636	0.01776
47	6865	3.398	2700	33.4105					-756	0.01896
48	7003	3.466	2300	35.5158					-823	0.01963
49	7023	3.476	1900	37.6211					-862	0.02002
50	7190	3.559	1500	39.7263					-901	0.02041
51	7090	3.510	1100	41.8316					-600	0.01740
52	6890	3.411	700	43.9368					-576	0.01716
53	6907	3.419	300	46.0421					-539	0.01679
54	6840	3.386	-100	48.1474					-535	0.01675
55	6970	3.450	-500	50.2526					-505	0.01645
56	6957	3.444	-900	52.3579					-512	0.01652
57	6923	3.427	-1300	54.4632					-499	0.01639
58	5870	2.906	-1700	56.5684					-243	0.01383
59	0	0.000	0	47.6211					-	
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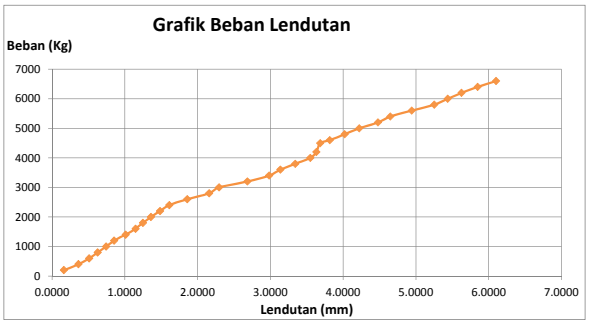

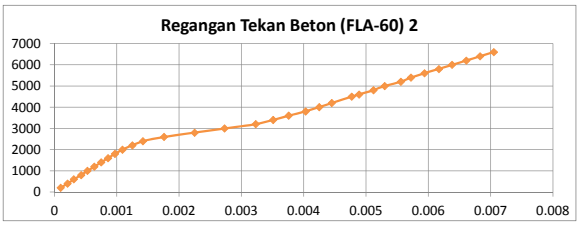

KODE : RC-O3

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	8933						552	
2	200	0.099	8892	0.2158					540	0.00012
3	400	0.198	8858	0.3947					527	0.00025
4	600	0.297	8824	0.5737					513	0.00039
5	800	0.396	8798	0.7105					500	0.00052
6	1000	0.495	8770	0.8579					483	0.00069
7	1200	0.594	8750	0.9632					473	0.00079
8	1400	0.693	8720	1.1211					456	0.00096
9	1600	0.792	8703	1.2105					443	0.00109
10	1800	0.891	8681	1.3263					427	0.00125
11	2000	0.990	8660	1.4368					412	0.0014
12	2200	1.089	8637	1.5579					395	0.00157
13	2400	1.188	8611	1.6947					374	0.00178
14	2600	1.287	8585	1.8316					345	0.00207
15	2800	1.386	8534	2.1000					308	0.00244
16	3000	1.485	8443	2.5789					183	0.00369
17	3200	1.584	8401	2.8000					138	0.00414
18	3400	1.683	8353	3.0526					84	0.00468
19	3600	1.782	8290	3.3842					44	0.00508
20	3800	1.881	8220	3.7526					12	0.0054
21	4000	1.980	8183	3.9474					-14	0.00566
22	4200	2.079	8120	4.2789					-44	0.00596
23	4400	2.178	8085	4.4632					-75	0.00627
24	4600	2.277	8042	4.6895					-106	0.00658
25	4870	2.411	8001	4.9053					-139	0.00691
26	5000	2.475	7972	5.0579					-159	0.00711
27	5200	2.574	7933	5.2632					-190	0.00742
28	5400	2.673	7895	5.4632					-218	0.0077
29	5600	2.772	7856	5.6684					-247	0.00799
30	5800	2.871	7813	5.8947					-277	0.00829
31	6000	2.970	7775	6.0947					-304	0.00856
32	6200	3.069	7706	6.4579					-473	0.01025
33	6250	3.094	7488	7.6053					-830	0.01382
34	6474	3.205	7100	9.6474					-1070	0.01622
35	6510	3.222	6700	11.7526					-1150	0.01702
36	6549	3.242	6300	13.8579					-1324	0.01876
37	6537	3.236	5900	15.9632					-1546	0.02098
38	6656	3.295	5500	18.0684					-1722	0.02274
39	6700	3.317	5100	20.1737					-1930	0.02482
40	6712	3.322	4700	22.2789					-2112	0.02664
41	6805	3.368	4300	24.3842					-2350	0.02902
42	6840	3.386	3900	26.4895					-2487	0.03039
43	6900	3.416	3500	28.5947					-2743	0.03295
44	6600	3.267	3100	30.7000					-2983	0.03535
45	6790	3.361	2700	32.8053					-3354	0.03906
46	6600	3.267	2300	34.9105					-3872	0.04424
47	6610	3.272	1900	37.0158					-4640	0.05192
48	6792	3.362	1500	39.1211					-4583	0.05135
49	6828	3.380	1100	41.2263					-3422	0.03974
50	6600	3.267	700	43.3316					-2670	0.03222
51	6400	3.168	300	45.4368					-1936	0.02488
52	6319	3.128	-900	51.7526					-1266	0.01818
53	5297	2.622	-1085	52.7263					-109	0.00661
54	0	0.000	-1300	53.8579						
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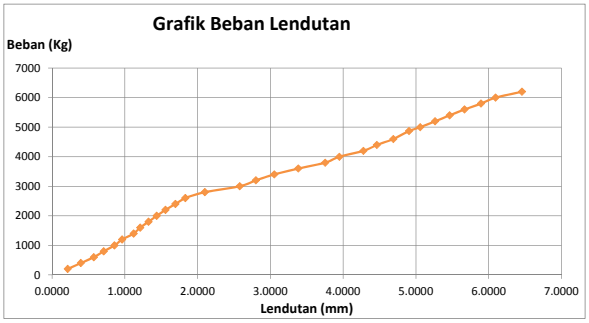

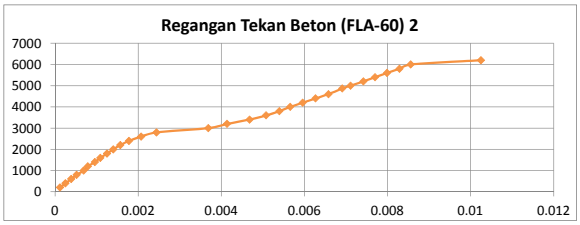

KODE : RC-O4

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	9441							
2	200	0.099	9399	0.2211						
3	400	0.198	9377	0.3368						
4	600	0.297	9355	0.4526						
5	800	0.396	9335	0.5579						
6	1000	0.495	9315	0.6632						
7	1200	0.594	9296	0.7632						
8	1400	0.693	9276	0.8684						
9	1600	0.792	9253	0.9895						
10	1800	0.891	9218	1.1737						
11	2000	0.990	9191	1.3158						
12	2200	1.089	9162	1.4684						
13	2400	1.188	9117	1.7053						
14	2600	1.287	9054	2.0368						
15	2800	1.386	9004	2.3000						
16	3000	1.485	8939	2.6421						
17	3200	1.584	8883	2.9368						
18	3400	1.683	8820	3.2684						
19	3600	1.782	8767	3.5474						
20	3800	1.881	8713	3.8316						
21	4000	1.980	8663	4.0947						
22	4200	2.079	8610	4.3737						
23	4400	2.178	8568	4.5947						
24	4600	2.277	8525	4.8211						
25	4800	2.376	8467	5.1263						
26	5000	2.475	8405	5.4526						
27	5200	2.574	8347	5.7579						
28	5400	2.673	8302	5.9947						
29	5600	2.772	8259	6.2211						
30	5800	2.871	8204	6.5105						
31	6000	2.970	8136	6.8684						
32	6200	3.069	7224	11.6684						
33	6250	3.094	6800	13.9000						
34	6190	3.064	6400	16.0053						
35	6308	3.122	6000	18.1105						
36	6370	3.153	5600	20.2158						
37	6420	3.178	5200	22.3211						
38	6517	3.226	4800	24.4263						
39	6520	3.227	4400	26.5316						
40	6550	3.242	4000	28.6368						
41	6570	3.252	3600	30.7421						
42	6613	3.273	3200	32.8474						
43	6780	3.356	2800	34.9526						
44	6790	3.361	2400	37.0579						
45	6800	3.366	2000	39.1632						
46	6843	3.387	1600	41.2684						
47	6901	3.416	1200	43.3737						
48	6879	3.405	800	45.4789						
49	6924	3.427	400	47.5842						
50	6970	3.450	0	49.6895						
51	6980	3.455	-400	51.7947						
52	7094	3.512	-800	53.9000						
53	7089	3.509	-1200	56.0053						
54	7105	3.517	-1600	58.1105						
55	5730	2.836	-1832	59.3316						
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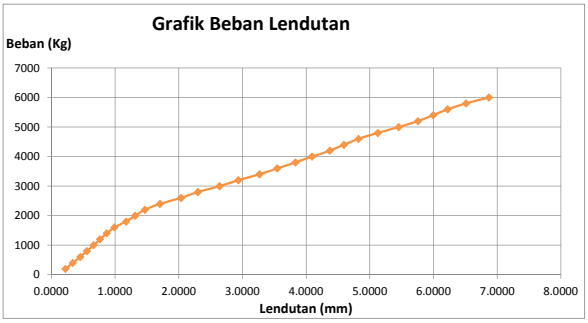

KODE : RC-O5

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	9125						83	
2	200	0.099	9082	0.2263					70	0.00013
3	400	0.198	9056	0.3632					59	0.00024
4	600	0.297	9029	0.5053					45	0.00038
5	800	0.396	9003	0.6421					33	0.00050
6	1000	0.495	8979	0.7684					21	0.00062
7	1200	0.594	8959	0.8737					9	0.00074
8	1400	0.693	8938	0.9842					-3	0.00086
9	1600	0.792	8913	1.1158					-17	0.00100
10	1800	0.891	8892	1.2263					-30	0.00113
11	2000	0.990	8855	1.4211					-47	0.00130
12	2200	1.089	8830	1.5526					-74	0.00157
13	2400	1.188	8791	1.7579					-168	0.00251
14	2600	1.287	8702	2.2263					-233	0.00316
15	2800	1.386	8625	2.6316					-273	0.00356
16	3000	1.485	8579	2.8737					-300	0.00383
17	3200	1.584	8532	3.1211					-328	0.00411
18	3400	1.683	8466	3.4684					-358	0.00441
19	3600	1.782	8426	3.6789					-384	0.00467
20	3800	1.881	8382	3.9105					-408	0.00491
21	4000	1.980	8339	4.1368					-435	0.00518
22	4200	2.079	8319	4.2421					-465	0.00548
23	4400	2.178	8278	4.4579					-494	0.00577
24	4600	2.277	8233	4.6947					-524	0.00607
25	4800	2.376	8194	4.9000					-550	0.00633
26	5000	2.475	8152	5.1211					-579	0.00662
27	5200	2.574	8109	5.3474					-609	0.00692
28	5400	2.673	8066	5.5737					-641	0.00724
29	5600	2.772	8021	5.8105					-671	0.00754
30	5800	2.871	7973	6.0632					-701	0.00784
31	6000	2.970	7915	6.3684					-735	0.00818
32	6200	3.069	7573	8.1684					-1059	0.01142
33	6230	3.084	7200	10.1316					-1579	0.01662
34	6330	3.133	6800	12.2368					-1980	0.02063
35	6360	3.148	6400	14.3421					-2429	0.02512
36	6390	3.163	6000	16.4474					-2813	0.02896
37	6475	3.205	5600	18.5526					-3141	0.03224
38	6375	3.156	5200	20.6579					-3365	0.03448
39	6500	3.218	4800	22.7632					-3564	0.03647
40	6608	3.271	4400	24.8684					-3695	0.03778
41	6614	3.274	4000	26.9737					-3856	0.03939
42	6686	3.310	3600	29.0789					-3995	0.04078
43	6697	3.315	3200	31.1842					-4103	0.04186
44	6687	3.310	2800	33.2895					-4174	0.04257
45	6725	3.329	2400	35.3947					-4239	0.04322
46	6741	3.337	2000	37.5000					-4326	0.04409
47	6825	3.378	1600	39.6053					-4475	0.04558
48	6958	3.444	1200	41.7105					-4601	0.04684
49	6810	3.371	800	43.8158					-4609	0.04692
50	6960	3.445	400	45.9211					-4670	0.04753
51	6936	3.433	0	48.0263					-4706	0.04789
52	7002	3.466	-400	50.1316					-4791	0.04874
53	7020	3.475	-800	52.2368					-4959	0.05042
54	6847	3.389	-1200	54.3421					-5058	0.05141
55	6928	3.429	-1600	56.4474					-5214	0.05297
56	6940	3.435	-2000	58.5526					-5877	0.05960
57	2936	1.453	-2400	60.6579			-			
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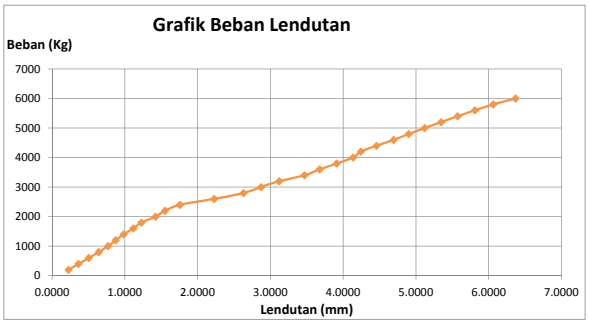

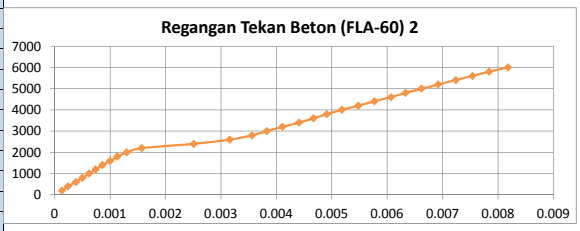

KODE : RC-O6

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	8667		1493		-953		-1244	
2	200	0.099	8636	0.1632	1495	0.00002	-960	0.00007	-1255	0.00011
3	400	0.198	8610	0.3000	1497	0.00004	-966	0.00013	-1267	0.00023
4	600	0.297	8582	0.4474	1499	0.00006	-973	0.00020	-1279	0.00035
5	800	0.396	8560	0.5632	1501	0.00008	-979	0.00026	-1290	0.00046
6	1000	0.495	8538	0.6789	1504	0.00011	-986	0.00033	-1303	0.00059
7	1200	0.594	8518	0.7842	1506	0.00013	-992	0.00039	-1316	0.00072
8	1400	0.693	8479	0.9895	1509	0.00016	-1000	0.00047	-1329	0.00085
9	1600	0.792	8485	0.9579	1511	0.00018	-1005	0.00052	-1344	0.00100
10	1800	0.891	8449	1.1474	1515	0.00022	-1015	0.00062	-1364	0.00120
11	2000	0.990	8425	1.2737	1518	0.00025	-1026	0.00073	-1391	0.00147
12	2200	1.089	8396	1.4263	1520	0.00027	-1038	0.00085	-1415	0.00171
13	2400	1.188	8370	1.5632	1525	0.00032	-1040	0.00087	-1441	0.00197
14	2600	1.287	8290	1.9842	1529	0.00036	-1043	0.00090	-1575	0.00331
15	2800	1.386	8238	2.2579	1535	0.00042	-1046	0.00093	-1615	0.00371
16	3000	1.485	8185	2.5368	1539	0.00046	-1050	0.00097	-1644	0.00400
17	3200	1.584	8120	2.8789	1542	0.00049	-1053	0.00100	-1644	0.00400
18	3400	1.683	8065	3.1684	1550	0.00057	-1054	0.00101	-1702	0.00458
19	3600	1.782	8020	3.4053	1554	0.00061	-1059	0.00106	-1729	0.00485
20	3800	1.881	7977	3.6316	1559	0.00066	-1064	0.00111	-1752	0.00508
21	4000	1.980	7932	3.8684	1566	0.00073	-1072	0.00119	-1779	0.00535
22	4200	2.079	7889	4.0947	1573	0.00080	-1076	0.00123	-1805	0.00561
23	4400	2.178	7845	4.3263	1584	0.00091	-1076	0.00123	-1833	0.00589
24	4600	2.277	7810	4.5105	1593	0.00100	-1088	0.00135	-1858	0.00614
25	4800	2.376	7757	4.7895	1602	0.00109	-1094	0.00141	-1882	0.00638
26	5000	2.475	7716	5.0053	1613	0.00120	-1098	0.00145	-1909	0.00665
27	5200	2.574	7673	5.2316	1619	0.00126	-1102	0.00149	-1935	0.00691
28	5400	2.673	7628	5.4684	1627	0.00134	-1103	0.00150	-1958	0.00714
29	5600	2.772	7562	5.8158	1639	0.00146	-1111	0.00158	-1993	0.00749
30	5800	2.871	7499	6.1474	1653	0.00160	-1113	0.00160	-2037	0.00793
31	6000	2.970	7300	7.1947	1704	0.00211	-1007	0.00054	-2313	0.01069
32	6200	3.069	7107	8.2105	1857	0.00364	-874	-0.00079	-2605	0.01361
33	6358	3.147	6700	10.3526	1893	0.00400	-798	-0.00155	-2775	0.01531
34	6405	3.170	6300	12.4579	1927	0.00434	-723	-0.00230	-2862	0.01618
35	6423	3.179	5900	14.5632	2449	0.00956	87	-0.01040	-3272	0.02028
36	6584	3.259	5500	16.6684	2390	0.00897	570	-0.01523	-3498	0.02254
37	6576	3.255	5100	18.7737	2361	0.00868	1018	-0.01971	-3711	0.02467
38	6592	3.263	4700	20.8789	2366	0.00873	2417	-0.03370	-4167	0.02923
39	6643	3.288	4300	22.9842	2352	0.00859	3253	-0.04206	-4476	0.03232
40	6743	3.338	3900	25.0895	2345	0.00852	3527	-0.04480	-4610	0.03366
41	6810	3.371	3500	27.1947			3731	-0.04684	-4705	0.03461
42	6849	3.390	3100	29.3000			4004	-0.04957	-4818	0.03574
43	6800	3.366	2700	31.4053			4480	-0.05433	-4959	0.03715
44	6898	3.415	2300	33.5105			4708	-0.05661	-5122	0.03878
45	6876	3.404	1900	35.6158			4973	-0.05926	-5225	0.03981
46	7001	3.465	1500	37.7211			5207	-0.06160	-5362	0.04118
47	7010	3.470	1100	39.8263			5427	-0.06380	-5462	0.04218
48	7014	3.472	700	41.9316			5530	-0.06483	-5543	0.04299
49	7163	3.546	300	44.0368			5712	-0.06665	-5652	0.04408
50	7125	3.527	-100	46.1421			5983	-0.06936	-5776	0.04532
51	7241	3.584	-500	48.2474					-5975	0.04731
52	7153	3.541	-900	50.3526					-6106	0.04862
53	7301	3.614	-1300	52.4579					-6287	0.05043
54	7350	3.638	-1700	54.5632					-6480	0.05236
55	7367	3.647	-2100	56.6684					-6704	0.05460
56	3254	1.611	-2500	58.7737					-6928	0.05684
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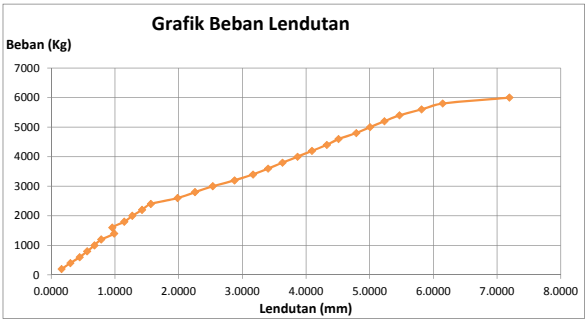

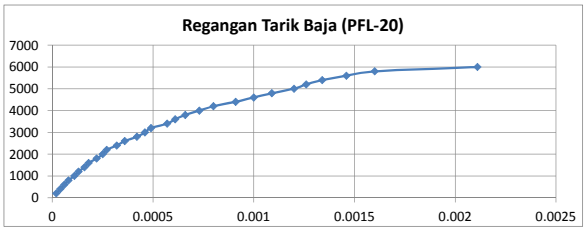

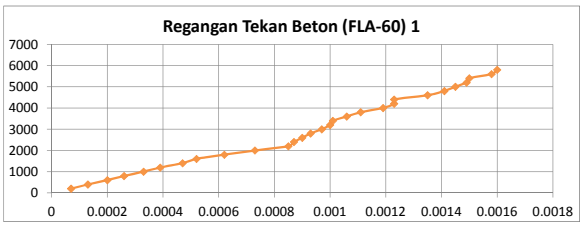

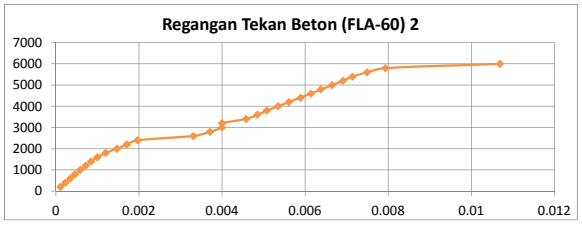

KODE : RC-O7

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	9570		844		329		310	
2	200	0.099	9522	0.2526	845	0.00001	319	0.00010	297	0.00013
3	400	0.198	9484	0.4526	846	0.00002	313	0.00016	288	0.00022
4	600	0.297	9452	0.6211	847	0.00003	306	0.00023	279	0.00031
5	800	0.396	9418	0.8000	849	0.00005	297	0.00032	269	0.00041
6	1000	0.495	9388	0.9579	850	0.00006	290	0.00039	258	0.00052
7	1200	0.594	9365	1.0789	852	0.00008	282	0.00047	247	0.00063
8	1400	0.693	9339	1.2158	853	0.00009	273	0.00056	235	0.00075
9	1600	0.792	9316	1.3368	855	0.00011	263	0.00066	224	0.00086
10	1800	0.891	9288	1.4842	856	0.00012	253	0.00076	212	0.00098
11	2000	0.990	9254	1.6632	862	0.00018	233	0.00096	186	0.00124
12	2200	1.089	9223	1.8263	879	0.00035	221	0.00108	165	0.00145
13	2400	1.188	9191	1.9947	899	0.00055	199	0.00130	140	0.00170
14	2600	1.287	9131	2.3105	978	0.00134	168	0.00161	92	0.00218
15	2800	1.386	9078	2.5895	1059	0.00215	159	0.00170	29	0.00281
16	3000	1.485	9014	2.9263	1092	0.00248	152	0.00177	-3	0.00313
17	3200	1.584	8956	3.2316	1120	0.00276	145	0.00184	-34	0.00344
18	3400	1.683	8927	3.3842	1141	0.00297	137	0.00192	-58	0.00368
19	3600	1.782	8885	3.6053	1163	0.00319	133	0.00196	-85	0.00395
20	3800	1.881	8836	3.8632	1188	0.00344	126	0.00203	-111	0.00421
21	4000	1.980	8795	4.0789	1207	0.00363	119	0.00210	-134	0.00444
22	4200	2.079	8752	4.3053	1229	0.00385	114	0.00215	-157	0.00467
23	4400	2.178	8713	4.5105	1251	0.00407	109	0.00220	-182	0.00492
24	4600	2.277	8668	4.7474	1269	0.00425	110	0.00219	-207	0.00517
25	4800	2.376	8627	4.9632	1290	0.00446	107	0.00222	-230	0.00540
26	5000	2.475	8588	5.1684	1313	0.00469	106	0.00223	-255	0.00565
27	5200	2.574	8548	5.3789	1337	0.00493	102	0.00227	-280	0.00590
28	5400	2.673	8508	5.5895	1361	0.00517	98	0.00231	-305	0.00615
29	5600	2.772	8471	5.7842	1383	0.00539	93	0.00236	-331	0.00641
30	5800	2.871	8433	5.9842	1403	0.00559	89	0.00240	-353	0.00663
31	6000	2.970	8394	6.1895	1426	0.00582	87	0.00242	-378	0.00688
32	6200	3.069	8351	6.4158	1448	0.00604	83	0.00246	-402	0.00712
33	6255	3.096	8185	7.2895	2006	0.01162	274	0.00055	-592	0.00902
34	6310	3.123	7800	9.3158	1501	0.00657	534	-0.00205	-869	0.01179
35	6414	3.175	7400	11.4211	2179	0.01335	548	-0.00219	-1067	0.01377
36	6340	3.138	7000	13.5263	-		744	-0.00415	-1303	0.01613
37	6448	3.192	6600	15.6316	-		884	-0.00555	-1530	0.01840
38	6598	3.266	6200	17.7368	-		1008	-0.00679	-1746	0.02056
39	6600	3.267	5800	19.8421	-		1333	-0.01004	-2045	0.02355
40	6630	3.282	5400	21.9474	-		1533	-0.01204	-2318	0.02628
41	6681	3.307	5000	24.0526	-		1607	-0.01278	-2541	0.02851
42	6540	3.237	4600	26.1579	-		1655	-0.01326	-2741	0.03051
43	6620	3.277	4200	28.2632	-		1962	-0.01633	-3066	0.03376
44	6597	3.266	3800	30.3684	-				-2935	0.03245
45	6783	3.358	3400	32.4737	-				-2878	0.03188
46	6710	3.321	3000	34.5789	-				-2793	0.03103
47	6793	3.363	2600	36.6842	-				-2715	0.03025
48	6701	3.317	2200	38.7895	-				-2676	0.02986
49	6820	3.376	1800	40.8947	-				-2674	0.02984
50	6920	3.425	1400	43.0000	-				-2655	0.02965
51	6974	3.452	1000	45.1053	-				-2669	0.02979
52	7029	3.479	600	47.2105	-				-2609	0.02919
53	7078	3.504	200	49.3158					-2600	0.02910
54	7145	3.537	-200	51.4211					-2631	0.02941
55	7150	3.539	-600	53.5263					-2685	0.02995
56	6734	3.333	-1000	55.6316						
57	6654	3.294	-1400	57.7368						
58	6434	3.185	-1800	59.8421						
59	3566	1.765	-2200	61.9474						
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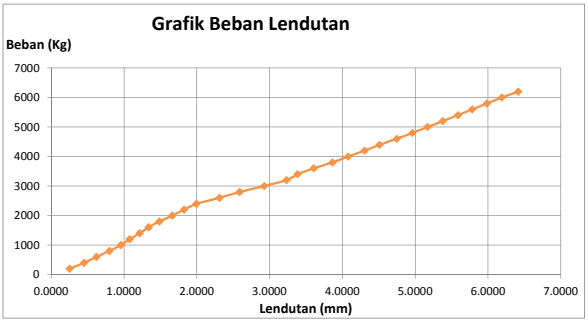

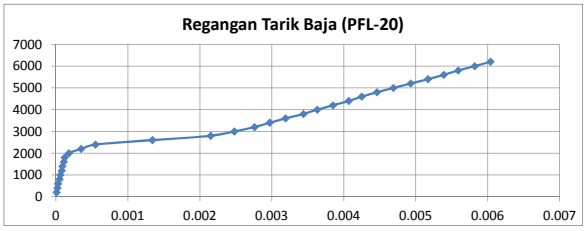

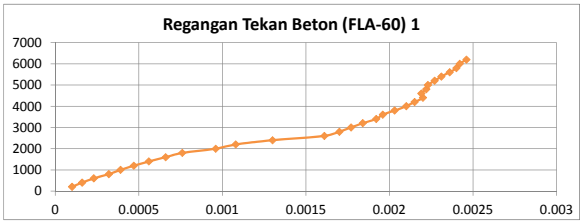

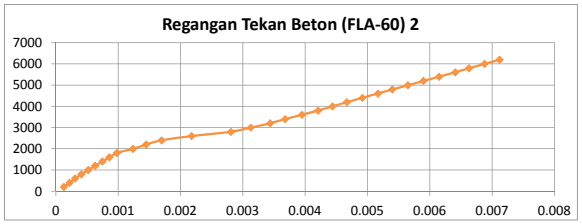

KODE : RC-O8

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	8254		1485		859		-480	
2	200	0.099	8229	0.1316	1488	0.00003	851	0.00008	-490	0.00010
3	400	0.198	8205	0.2579	1491	0.00006	843	0.00016	-498	0.00018
4	600	0.297	8178	0.4000	1494	0.00009	834	0.00025	-508	0.00028
5	800	0.396	8155	0.5211	1501	0.00016	826	0.00033	-518	0.00038
6	1000	0.495	8133	0.6368	1506	0.00021	818	0.00041	-528	0.00048
7	1200	0.594	8112	0.7474	1512	0.00027	808	0.00051	-539	0.00059
8	1400	0.693	8088	0.8737	1526	0.00041	798	0.00061	-552	0.00072
9	1600	0.792	8063	1.0053	1541	0.00056	785	0.00074	-567	0.00087
10	1800	0.891	8037	1.1421	1554	0.00069	774	0.00085	-582	0.00102
11	2000	0.990	8010	1.2842	1565	0.00080	761	0.00098	-599	0.00119
12	2200	1.089	7982	1.4316	1583	0.00098	742	0.00117	-619	0.00139
13	2400	1.188	7935	1.6789	1607	0.00122	718	0.00141	-644	0.00164
14	2600	1.287	7870	2.0211	1737	0.00252	674	0.00185	-732	0.00252
15	2800	1.386	7816	2.3053	1762	0.00277	662	0.00197	-762	0.00282
16	3000	1.485	7767	2.5632	1789	0.00304	650	0.00209	-788	0.00308
17	3200	1.584	7693	2.9526	1813	0.00328	638	0.00221	-813	0.00333
18	3400	1.683	7640	3.2316	1838	0.00353	627	0.00232	-834	0.00354
19	3600	1.782	7587	3.5105	1875	0.00390	614	0.00245	-858	0.00378
20	3800	1.881	7545	3.7316	1891	0.00406	605	0.00254	-878	0.00398
21	4000	1.980	7505	3.9421	1926	0.00441	594	0.00265	-902	0.00422
22	4200	2.079	7467	4.1421	1948	0.00463	583	0.00276	-923	0.00443
23	4400	2.178	7424	4.3684	1967	0.00482	573	0.00286	-944	0.00464
24	4600	2.277	7390	4.5474	1995	0.00510	560	0.00299	-969	0.00489
25	4800	2.376	7346	4.7789	2005	0.00520	550	0.00309	-987	0.00507
26	5000	2.475	7309	4.9737	2039	0.00554	539	0.00320	-1010	0.00530
27	5200	2.574	7269	5.1842	2062	0.00577	529	0.00330	-1031	0.00551
28	5400	2.673	7228	5.4000	2088	0.00603	517	0.00342	-1054	0.00574
29	5600	2.772	7190	5.6000	2111	0.00626	507	0.00352	-1073	0.00593
30	5800	2.871	7149	5.8158	2131	0.00646	494	0.00365	-1095	0.00615
31	6000	2.970	7111	6.0158	2160	0.00675	484	0.00375	-1116	0.00636
32	6200	3.069	7041	6.3842	2173	0.00688	479	0.00380	-1129	0.00649
33	6200	3.069	6780	7.7579	2156	0.00671	487	0.00372	-1123	0.00643
34	6320	3.128	6400	9.7579	3099	0.01614	492	0.00367	-1326	0.00846
35	6470	3.203	6000	11.8632	1792	0.00307	697	0.00162	-1592	0.01112
36	6390	3.163	5600	13.9684	1888	0.00403	899	-0.00040	-1682	0.01202
37	6320	3.128	5200	16.0737	1659	0.00174	1284	-0.00425	-1787	0.01307
38	6370	3.153	4800	18.1789	1642	0.00157	1572	-0.00713	-1929	0.01449
39	6440	3.188	4400	20.2842	1701	0.00216	1866	-0.01007	-2003	0.01523
40	6391	3.164	4000	22.3895	1693	0.00208	2170	-0.01311	-2063	0.01583
41	6520	3.227	3600	24.4947	1675	0.00190	2233	-0.01374	-2128	0.01648
42	6480	3.208	3200	26.6000	1704	0.00219	2069	-0.01210	-2168	0.01688
43	6480	3.208	2800	28.7053	1708	0.00223	1932	-0.01073	-2204	0.01724
44	6580	3.257	2400	30.8105	1705	0.00220	1732	-0.00873	-2237	0.01757
45	6548	3.241	2000	32.9158	1679	0.00194	1189	-0.00330	-2165	0.01685
46	6369	3.153	1600	35.0211	1689	0.00204	777	0.00082	-1978	0.01498
47	6553	3.244	1200	37.1263	1691	0.00206	683	0.00176	-1934	0.01454
48	6502	3.218	800	39.2316	1668	0.00183	669	0.00190	-1891	0.01411
49	5940	2.940	400	41.3368	1620	0.00135	-	-	-761	0.00281
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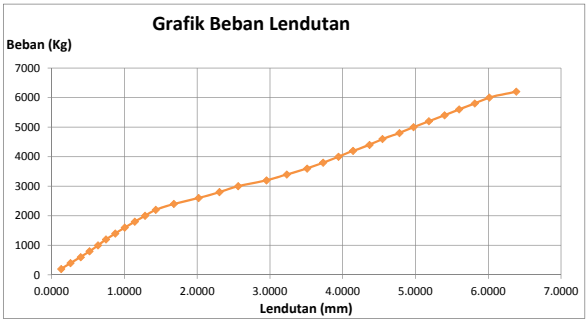

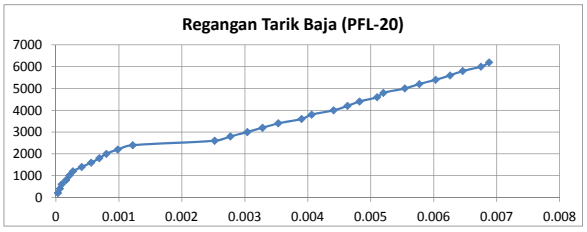

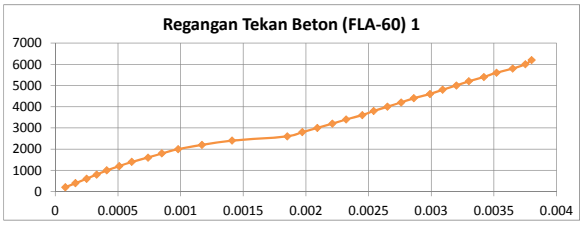

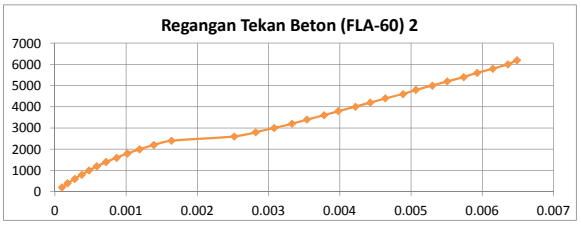

KODE : RC-O9

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	7618		1460		6989		5831	
2	200	0.099	7588	0.1579	1463	0.00003	6981	0.00008	5820	0.00011
3	446	0.221	7556	0.3263	1467	0.00007	6973	0.00016	5807	0.00024
4	600	0.297	7535	0.4368	1471	0.00011	6967	0.00022	5798	0.00033
5	800	0.396	7513	0.5526	1474	0.00014	6960	0.00029	5788	0.00043
6	1000	0.495	7491	0.6684	1478	0.00018	6950	0.00039	5775	0.00056
7	1200	0.594	7467	0.7947	1480	0.00020	6944	0.00045	5767	0.00064
8	1400	0.693	7419	1.0474	1483	0.00023	6935	0.00054	5750	0.00081
9	1600	0.792	7398	1.1579	1485	0.00025	6926	0.00063	5735	0.00096
10	1800	0.891	7375	1.2789	1488	0.00028	6913	0.00076	5718	0.00113
11	2000	0.990	7353	1.3947	1490	0.00030	6901	0.00088	5697	0.00134
12	2200	1.089	7330	1.5158	1492	0.00032	6888	0.00101	5679	0.00152
13	2400	1.188	7297	1.6895	1495	0.00035	6876	0.00113	5651	0.00180
14	2600	1.287	7207	2.1632	1497	0.00037	6832	0.00157	5555	0.00276
15	2800	1.386	7134	2.5474	1498	0.00038	6821	0.00168	5523	0.00308
16	3000	1.485	7085	2.8053	1502	0.00042	6804	0.00185	5494	0.00337
17	3200	1.584	7030	3.0947	1506	0.00046	6798	0.00191	5460	0.00371
18	3400	1.683	6981	3.3526	1510	0.00050	6768	0.00221	5430	0.00401
19	3600	1.782	6940	3.5684	1515	0.00055	6760	0.00229	5409	0.00422
20	3800	1.881	6896	3.8000	1519	0.00059	6746	0.00243	5385	0.00446
21	4000	1.980	6853	4.0263	1527	0.00067	6734	0.00255	5365	0.00466
22	4200	2.079	6812	4.2421	1534	0.00074	6720	0.00269	5344	0.00487
23	4400	2.178	6770	4.4632	1542	0.00082	6709	0.00280	5324	0.00507
24	4600	2.277	6723	4.7105	1548	0.00088	6700	0.00289	5306	0.00525
25	4800	2.376	6678	4.9474	1560	0.00100	6690	0.00299	5282	0.00549
26	5000	2.475	6629	5.2053	1567	0.00107	6679	0.00310	5262	0.00569
27	5200	2.574	6575	5.4895	1574	0.00114	6667	0.00322	5240	0.00591
28	5400	2.673	6525	5.7526	1581	0.00121	6658	0.00331	5220	0.00611
29	5600	2.772	6428	6.2632	1585	0.00125	6649	0.00340	5195	0.00636
30	5800	2.871	6438	6.2105	1590	0.00130	6641	0.00348	5173	0.00658
31	6000	2.970	6366	6.5895	1599	0.00139	6632	0.00357	5140	0.00691
32	6200	3.069	6315	6.8579	1600	0.00140	6630	0.00359	5121	0.00710
33	6250	3.094	6090	8.0421	1592	0.00132	6649	0.00340	5111	0.00720
34	6350	3.143	5700	10.0947	1607	0.00147	6685	0.00304	4924	0.00907
35	6200	3.069	5300	12.2000	1658	0.00198	6898	0.00091	4521	0.01310
36	6300	3.119	4900	14.3053	1677	0.00217	7299	-0.00310	4223	0.01608
37	6450	3.193	4500	16.4105	1623	0.00163	7781	-0.00792	4027	0.01804
38	6529	3.232	4100	18.5158	1579	0.00119	8001	-0.01012	3921	0.01910
39	6459	3.197	3700	20.6211	1472	0.00012	8437	-0.01448	3763	0.02068
40	6540	3.237	3300	22.7263	1523	0.00063	9081	-0.02092	3574	0.02257
41	6540	3.237	2900	24.8316	1586	0.00126			3356	0.02475
42	6600	3.267	2500	26.9368	1554	0.00094			2955	0.02876
43	6800	3.366	2100	29.0421	1627	0.00167			2705	0.03126
44	6700	3.317	1700	31.1474	1600	0.00140			2525	0.03306
45	6650	3.292	1300	33.2526	1619	0.00159			2364	0.03467
46	6720	3.326	900	35.3579	1645	0.00185			2271	0.03560
47	6818	3.375	500	37.4632	1462	0.00002			2197	0.03634
48	6780	3.356	100	39.5684	1217	-0.00243			2259	0.03572
49	6886	3.409	-300	41.6737	1320	-0.00140			2461	0.03370
50	6906	3.418	-700	43.7789	1290	-0.00170			2662	0.03169
51	6880	3.406	-1100	45.8842	1212	-0.00248			4086	0.01745
52	6800	3.366	-1500	47.9895	1267	-0.00193			4452	0.01379
53	6900	3.416	-1900	50.0947	1166	-0.00294			4830	0.01001
54	7076	3.503	-2300	52.2000	1177	-0.00283			5167	0.00664
55	5743	2.843	-2700	54.3053	1520	0.00060			5167	0.00664
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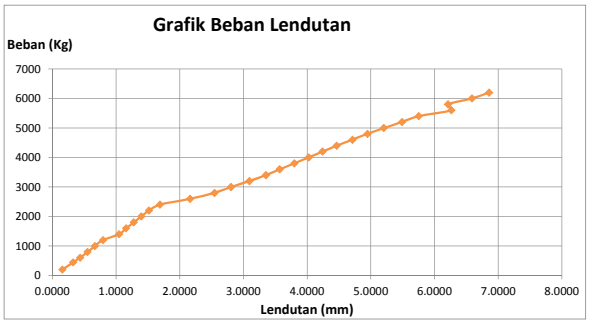

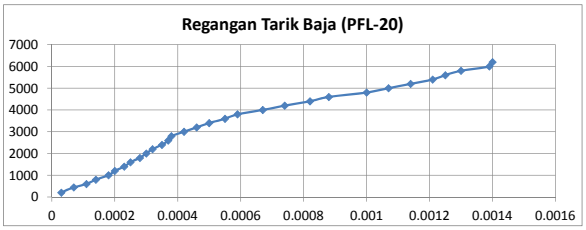

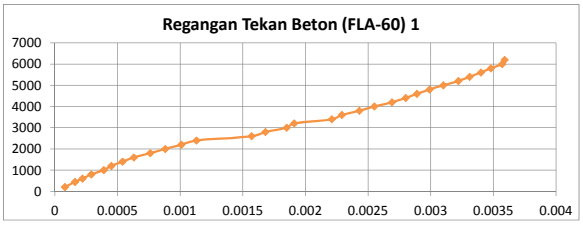

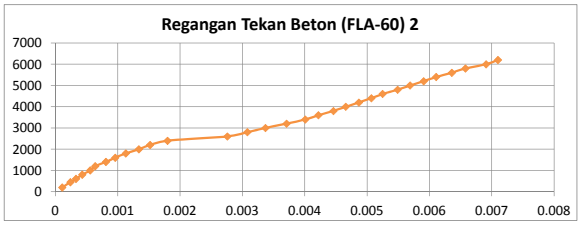

KODE : RC-O10

No	Beban (Kg)	Momen (KN.m)	Pembacaan Lendutan	Lendutan (mm)	Bacan Regangan Baja	Regangan Baja	Bacaan Regangan Beton 1	Regangan Beton 1	Bacaan Regangan Beton 2	Regangan Beton 2
1	0	0.000	8914		256		-538		380	
2	300	0.149	8885	0.1526	258	0.00002	-548	0.00010	366	0.00014
3	400	0.198	8849	0.3421	260	0.00004	-556	0.00018	352	0.00028
4	600	0.297	8820	0.4947	261	0.00005	-563	0.00025	342	0.00038
5	800	0.396	8790	0.6526	262	0.00006	-572	0.00034	328	0.00052
6	1000	0.495	8764	0.7895	263	0.00007	-580	0.00042	315	0.00065
7	1200	0.594	8740	0.9158	265	0.00009	-589	0.00051	301	0.00079
8	1400	0.693	8717	1.0368	267	0.00011	-597	0.00059	287	0.00093
9	1600	0.792	8694	1.1579	269	0.00013	-607	0.00069	269	0.00111
10	1800	0.891	8670	1.2842	271	0.00015	-623	0.00085	244	0.00136
11	2000	0.990	8662	1.3263	272	0.00016	-628	0.00090	234	0.00146
12	2200	1.089	8609	1.6053	281	0.00025	-652	0.00114	160	0.00220
13	2400	1.188	8558	1.8737	306	0.00050	-650	0.00112	91	0.00289
14	2600	1.287	8485	2.2579	298	0.00042	-649	0.00111	46	0.00334
15	2800	1.386	8421	2.5947	291	0.00035	-646	0.00108	18	0.00362
16	3000	1.485	8378	2.8211	272	0.00016	-650	0.00112	-15	0.00395
17	3200	1.584	8336	3.0421	265	0.00009	-645	0.00107	-50	0.00430
18	3400	1.683	8296	3.2526	264	0.00008	-637	0.00099	-80	0.00460
19	3600	1.782	8258	3.4526	266	0.00010	-634	0.00096	-112	0.00492
20	3800	1.881	8212	3.6947	262	0.00006	-628	0.00090	-146	0.00526
21	4000	1.980	8173	3.9000	256	0.00000	-634	0.00096	-182	0.00562
22	4200	2.079	8138	4.0842	251	-0.00005	-631	0.00093	-212	0.00592
23	4450	2.203	8084	4.3684	245	-0.00011	-627	0.00089	-212	0.00592
24	4600	2.277	8048	4.5579	247	-0.00009	-627	0.00089	-271	0.00651
25	4800	2.376	8009	4.7632	241	-0.00015	-630	0.00092	-309	0.00689
26	5000	2.475	7970	4.9684	239	-0.00017	-628	0.00090	-342	0.00722
27	5200	2.574	7932	5.1684	242	-0.00014	-629	0.00091	-372	0.00752
28	5400	2.673	7885	5.4158	241	-0.00015	-626	0.00088	-413	0.00793
29	5600	2.772	7840	5.6526	240	-0.00016	-618	0.00080	-452	0.00832
30	5800	2.871	7793	5.9000	241	-0.00015	-602	0.00064	-496	0.00876
31	6000	2.970	7593	6.9526	243	-0.00013	-291	-0.00247	-780	0.01160
32	6200	3.069	7362	8.1684	251	-0.00005	-215	-0.00323	-1152	0.01532
33	6400	3.168	6912	10.5368	263	0.00007	-1157	0.00619	-1724	0.02104
34	6460	3.198	6495	12.7316	259	0.00003	-1586	0.01048	-2015	0.02395
35	6671	3.302	6100	14.8105	262	0.00006	-1958	0.01420	-2244	0.02624
36	6580	3.257	5700	16.9158	267	0.00011	-2315	0.01777	-2449	0.02829
37	6790	3.361	5300	19.0211	258	0.00002	-2593	0.02055	-2600	0.02980
38	6890	3.411	4900	21.1263	310	0.00054	-3364	0.02826	-2871	0.03251
39	6766	3.349	4500	23.2316	475	0.00219			-3098	0.03478
40	6670	3.302	4100	25.3368	355	0.00099			-3448	0.03828
41	6855	3.393	3700	27.4421	401	0.00145			-3687	0.04067
42	6860	3.396	3300	29.5474	357	0.00101			-3278	0.03658
43	6850	3.391	2900	31.6526	382	0.00126			-2705	0.03085
44	6920	3.425	2500	33.7579	338	0.00082			-2127	0.02507
45	6910	3.420	2100	35.8632	414	0.00158			-1680	0.02060
46	7001	3.465	1700	37.9684	372	0.00116			-1456	0.01836
47	6932	3.431	1300	40.0737	440	0.00184			-1242	0.01622
48	7046	3.488	900	42.1789	492	0.00236			-1046	0.01426
49	7078	3.504	500	44.2842	506	0.00250			-854	0.01234
50	7053	3.491	100	46.3895	520	0.00264			-686	0.01066
51	7156	3.542	-300	48.4947	-527	-0.00783			-623	0.01003
52	7220	3.574	-700	50.6000	-506	-0.00762			-610	0.00990
53	7275	3.601	-1100	52.7053	-563	-0.00819			-595	0.00975
54	7205	3.566	-1500	54.8105	-607	-0.00863			-526	0.00906
55	7042	3.486	-1900	56.9158	-649	-0.00905			-479	0.00859
56	7083	3.506	-2300	59.0211	-684	-0.00940			-449	0.00829
57	7165	3.547	-2700	61.1263	-694	-0.00950			-422	0.00802
58	6980	3.455	-3100	63.2316	-712	-0.00968			-399	0.00779
59	2765	1.369	-3500	65.3368	-187	-0.00443			-237	0.00617
60										
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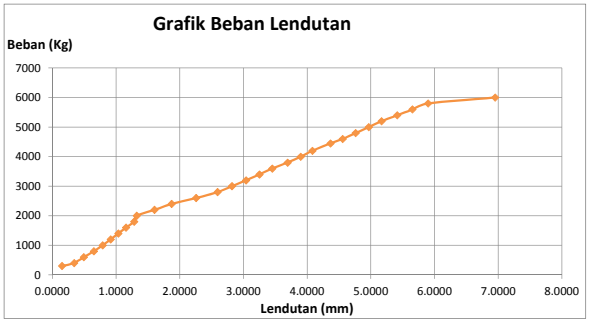
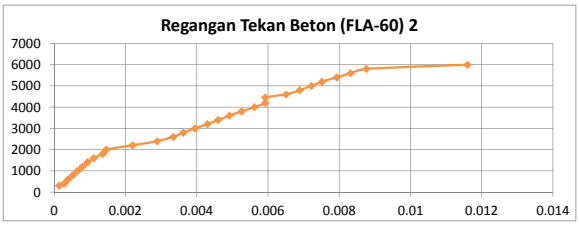
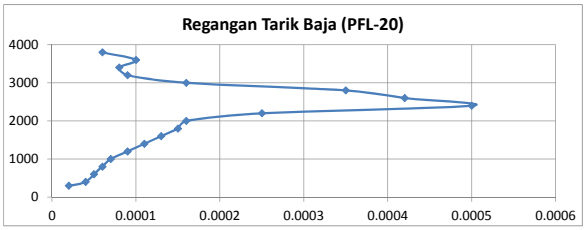
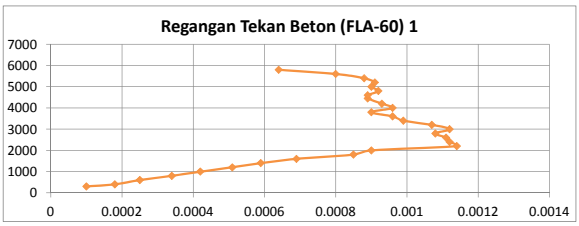


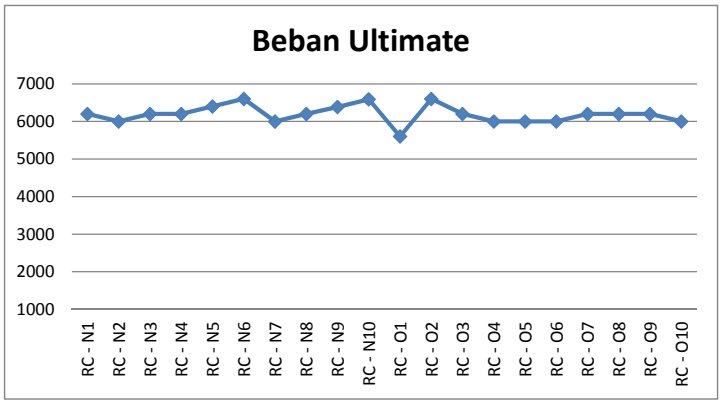




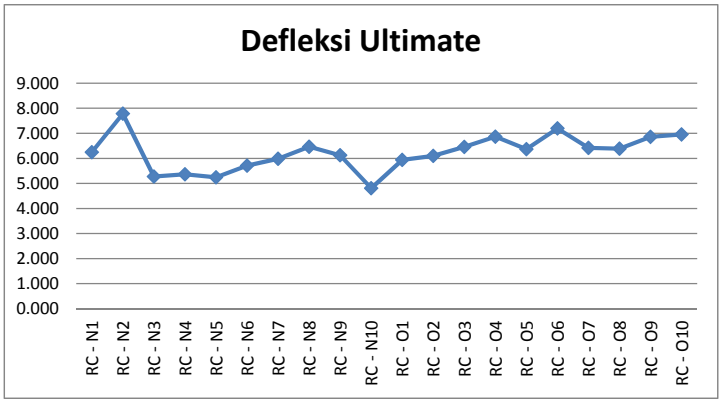


Rekapitulasi Hasil Pengujian Balok Beban - Lendutan

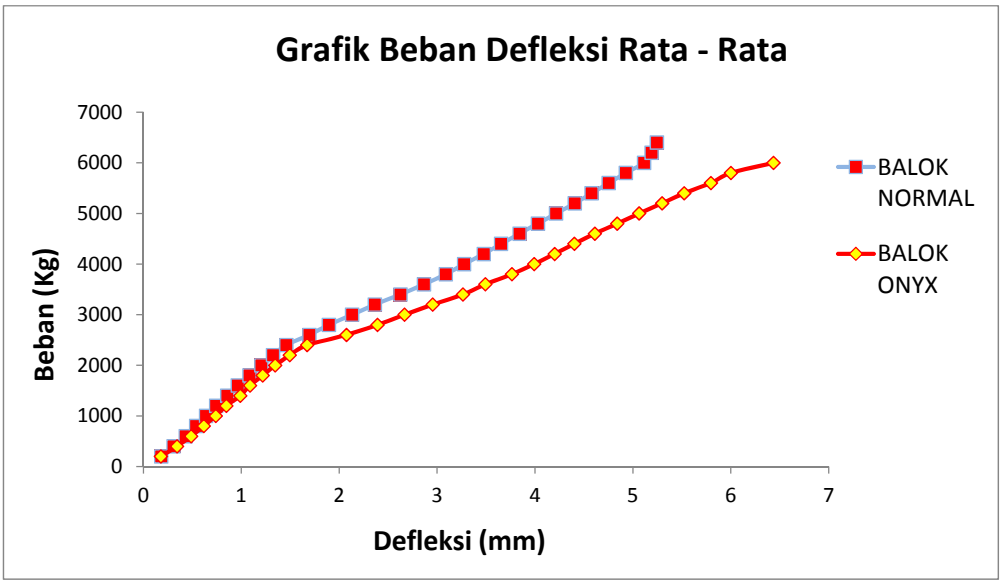
No	Nama Balok	Beban Ultimate (Kg)	Lendutan (mm)
1	RC - N1	6200	6.245
2	RC - N2	6000	7.782
3	RC - N3	6200	5.273
4	RC - N4	6200	5.364
5	RC - N5	6400	5.245
6	RC - N6	6600	5.709
7	RC - N7	6000	5.982
8	RC - N8	6200	6.464
9	RC - N9	6384	6.122
10	RC - N10	6589	4.811
11	RC - O1	5600	5.937
12	RC - O2	6600	6.100
13	RC - O3	6200	6.458
14	RC - O4	6000	6.868
15	RC - O5	6000	6.368
16	RC - O6	6000	7.195
17	RC - O7	6200	6.416
18	RC - O8	6200	6.384
19	RC - O9	6200	6.858
20	RC - O10	6000	6.953



Gambar : Grafik Beban Ultimate Masing - Masing Balok



Gambar : Grafik Lendutan Ultimate Masing - Masing Balok



Gambar : Grafik Rata - Rata Beban Lendutan

LAMPIRAN 5

MODULUS ELASTISITAS

Analisa Modulus Elastisitas

RC-N1-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0014	0.0140	1.16	0.00007
30	0.0021	0.0210	1.73	0.00011
40	0.0026	0.0260	2.31	0.00013
50	0.0032	0.0320	2.89	0.00016
60	0.0039	0.0390	3.47	0.00020
70	0.0045	0.0450	4.04	0.00023
80	0.0050	0.0500	4.62	0.00025
90	0.0058	0.0580	5.20	0.00029
100	0.0063	0.0630	5.78	0.00032
110	0.0068	0.0680	6.36	0.00034
120	0.0072	0.0720	6.93	0.00036
130	0.0076	0.0760	7.51	0.00038
140	0.0081	0.0810	8.09	0.00041
150	0.0087	0.0870	8.67	0.00044
160	0.0092	0.0920	9.25	0.00046
170	0.0099	0.0990	9.82	0.00050
180	0.0103	0.1030	10.40	0.00052
190	0.0109	0.1090	10.98	0.00055
200	0.0114	0.1140	11.56	0.00057
210	0.0119	0.1190	12.13	0.00060
220	0.0123	0.1230	12.71	0.00062
230	0.0131	0.1310	13.29	0.00066
240	0.0138	0.1380	13.87	0.00069
250	0.0143	0.1430	14.45	0.00072
260	0.0149	0.1490	15.02	0.00075
270	0.0152	0.1520	15.60	0.00076
280	0.0157	0.1570	16.18	0.00079
290	0.0162	0.1620	16.76	0.00081
300	0.0167	0.1670	17.33	0.00084
310	0.0172	0.1720	17.91	0.00086
320	0.0175	0.1750	18.49	0.00088
330	0.0179	0.1790	19.07	0.00090
340	0.0184	0.1840	19.65	0.00092
350	0.0187	0.1870	20.22	0.00094
360	0.0203	0.2030	20.80	0.00102
370	0.0209	0.2090	21.38	0.00105
380	0.0218	0.2180	21.96	0.00109
390	0.0223	0.2230	22.54	0.00112
400	0.0229	0.2290	23.11	0.00115
410	0.0232	0.2320	23.69	0.00116
420	0.0239	0.2390	24.27	0.00120
430	0.0246	0.2460	24.85	0.00123
440	0.0255	0.2550	25.42	0.00128
450	0.0264	0.2640	26.00	0.00132
460	0.0276	0.2760	26.58	0.00138
470	0.0285	0.2850	27.16	0.00143
480	0.0291	0.2910	27.74	0.00146
490	0.0302	0.3020	28.31	0.00151
500	0.0309	0.3090	28.89	0.00155
510	0.0315	0.3150	29.47	0.00158
520	0.0322	0.3220	30.05	0.00161
533	0.0329	0.3290	30.80	0.00165

Analisa Modulus Elastisitas

RC-N1-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0005	0.0050	1.16	0.00003
30	0.0010	0.0100	1.73	0.00005
40	0.0015	0.0150	2.31	0.00008
50	0.0018	0.0180	2.89	0.00009
60	0.0023	0.0230	3.47	0.00012
70	0.0027	0.0270	4.04	0.00014
80	0.0032	0.0320	4.62	0.00016
90	0.0043	0.0430	5.20	0.00022
100	0.0055	0.0550	5.78	0.00028
110	0.0067	0.0670	6.36	0.00034
120	0.0075	0.0750	6.93	0.00038
130	0.0086	0.0860	7.51	0.00043
140	0.0097	0.0970	8.09	0.00049
150	0.0105	0.1050	8.67	0.00053
160	0.0116	0.1160	9.25	0.00058
170	0.0125	0.1250	9.82	0.00063
180	0.0136	0.1360	10.40	0.00068
190	0.0146	0.1460	10.98	0.00073
200	0.0156	0.1560	11.56	0.00078
210	0.0163	0.1630	12.13	0.00082
220	0.0168	0.1680	12.71	0.00084
230	0.0172	0.1720	13.29	0.00086
240	0.0177	0.1770	13.87	0.00089
250	0.0193	0.1930	14.45	0.00097
260	0.0202	0.2020	15.02	0.00101
270	0.0213	0.2130	15.60	0.00107
280	0.0222	0.2220	16.18	0.00111
290	0.0233	0.2330	16.76	0.00117
300	0.0242	0.2420	17.33	0.00121
310	0.0249	0.2490	17.91	0.00125
320	0.0258	0.2580	18.49	0.00129
330	0.0264	0.2640	19.07	0.00132
340	0.0269	0.2690	19.65	0.00135
350	0.0275	0.2750	20.22	0.00138
360	0.0283	0.2830	20.80	0.00142
370	0.0294	0.2940	21.38	0.00147
380	0.0301	0.3010	21.96	0.00151
390	0.0309	0.3090	22.54	0.00155
400	0.0323	0.3230	23.11	0.00162
410	0.0329	0.3290	23.69	0.00165
420	0.0339	0.3390	24.27	0.00170
430	0.0348	0.3480	24.85	0.00174
440	0.0358	0.3580	25.42	0.00179
446	0.0367	0.3670	25.77	0.00184

Analisa Modulus Elastisitas

RC-N2-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0010	0.0100	0.58	0.00005
20	0.0015	0.0150	1.16	0.00008
30	0.0019	0.0190	1.73	0.00010
40	0.0024	0.0240	2.31	0.00012
50	0.0029	0.0290	2.89	0.00015
60	0.0034	0.0340	3.47	0.00017
70	0.0038	0.0380	4.04	0.00019
80	0.0044	0.0440	4.62	0.00022
90	0.0050	0.0500	5.20	0.00025
100	0.0055	0.0550	5.78	0.00028
110	0.0061	0.0610	6.36	0.00031
120	0.0066	0.0660	6.93	0.00033
130	0.0071	0.0710	7.51	0.00036
140	0.0080	0.0800	8.09	0.00040
150	0.0088	0.0880	8.67	0.00044
160	0.0094	0.0940	9.25	0.00047
170	0.0099	0.0990	9.82	0.00050
180	0.0105	0.1050	10.40	0.00053
190	0.0109	0.1090	10.98	0.00055
200	0.0114	0.1140	11.56	0.00057
210	0.0119	0.1190	12.13	0.00060
220	0.0124	0.1240	12.71	0.00062
230	0.0129	0.1290	13.29	0.00065
240	0.0135	0.1350	13.87	0.00068
250	0.0140	0.1400	14.45	0.00070
260	0.0146	0.1460	15.02	0.00073
270	0.0151	0.1510	15.60	0.00076
280	0.0157	0.1570	16.18	0.00079
290	0.0161	0.1610	16.76	0.00081
300	0.0166	0.1660	17.33	0.00083
310	0.0170	0.1700	17.91	0.00085
320	0.0175	0.1750	18.49	0.00088
330	0.0181	0.1810	19.07	0.00091
340	0.0185	0.1850	19.65	0.00093
349	0.0190	0.1900	20.17	0.00095

Analisa Modulus Elastisitas

RC-N2-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0010	0.0100	0.58	0.00005
20	0.0020	0.0200	1.16	0.00010
30	0.0030	0.0300	1.73	0.00015
40	0.0040	0.0400	2.31	0.00020
50	0.0050	0.0500	2.89	0.00025
60	0.0060	0.0600	3.47	0.00030
70	0.0070	0.0700	4.04	0.00035
80	0.0080	0.0800	4.62	0.00040
90	0.0090	0.0900	5.20	0.00045
100	0.0110	0.1100	5.78	0.00055
110	0.0120	0.1200	6.36	0.00060
120	0.0130	0.1300	6.93	0.00065
130	0.0140	0.1400	7.51	0.00070
140	0.0150	0.1500	8.09	0.00075
150	0.0160	0.1600	8.67	0.00080
160	0.0170	0.1700	9.25	0.00085
170	0.0180	0.1800	9.82	0.00090
180	0.0190	0.1900	10.40	0.00095
190	0.0200	0.2000	10.98	0.00100
200	0.0210	0.2100	11.56	0.00105
210	0.0220	0.2200	12.13	0.00110
220	0.0230	0.2300	12.71	0.00115
230	0.0240	0.2400	13.29	0.00120
240	0.0250	0.2500	13.87	0.00125
250	0.0259	0.2590	14.45	0.00130
260	0.0268	0.2680	15.02	0.00134
270	0.0275	0.2750	15.60	0.00138
280	0.0285	0.2850	16.18	0.00143
290	0.0295	0.2950	16.76	0.00148
300	0.0305	0.3050	17.33	0.00153
310	0.0315	0.3150	17.91	0.00158
320	0.0322	0.3220	18.49	0.00161
330	0.0329	0.3290	19.07	0.00165
340	0.0335	0.3350	19.65	0.00168
350	0.0341	0.3410	20.22	0.00171
360	0.0347	0.3470	20.80	0.00174
370	0.0358	0.3580	21.38	0.00179
380	0.0365	0.3650	21.96	0.00183
390	0.0371	0.3710	22.54	0.00186
400	0.0379	0.3790	23.11	0.00190
410	0.0390	0.3900	23.69	0.00195
420	0.0399	0.3990	24.27	0.00200
430	0.0405	0.4050	24.85	0.00203
440	0.0412	0.4120	25.42	0.00206
450	0.0420	0.4200	26.00	0.00210
460	0.0430	0.4300	26.58	0.00215
470	0.0446	0.4460	27.16	0.00223
480	0.0460	0.4600	27.74	0.00230
490	0.0470	0.4700	28.31	0.00235
500	0.0480	0.4800	28.89	0.00240
510	0.0510	0.5100	29.47	0.00255
520	0.0520	0.5200	30.05	0.00260
530	0.0550	0.5500	30.63	0.00275
535	0.0590	0.5900	30.91	0.00295

Analisa Modulus Elastisitas

RC-N3-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0021	0.0210	2.31	0.00011
50	0.0025	0.0250	2.89	0.00013
60	0.0029	0.0290	3.47	0.00015
70	0.0033	0.0330	4.04	0.00017
80	0.0037	0.0370	4.62	0.00019
90	0.0042	0.0420	5.20	0.00021
100	0.0047	0.0470	5.78	0.00024
110	0.0052	0.0520	6.36	0.00026
120	0.0056	0.0560	6.93	0.00028
130	0.0062	0.0620	7.51	0.00031
140	0.0068	0.0680	8.09	0.00034
150	0.0073	0.0730	8.67	0.00037
160	0.0077	0.0770	9.25	0.00039
170	0.0083	0.0830	9.82	0.00042
180	0.0088	0.0880	10.40	0.00044
190	0.0094	0.0940	10.98	0.00047
200	0.0099	0.0990	11.56	0.00050
210	0.0104	0.1040	12.13	0.00052
220	0.0108	0.1080	12.71	0.00054
230	0.0113	0.1130	13.29	0.00057
240	0.0118	0.1180	13.87	0.00059
250	0.0123	0.1230	14.45	0.00062
260	0.0128	0.1280	15.02	0.00064
270	0.0134	0.1340	15.60	0.00067
280	0.0139	0.1390	16.18	0.00070
290	0.0144	0.1440	16.76	0.00072
300	0.0149	0.1490	17.33	0.00075
310	0.0154	0.1540	17.91	0.00077
320	0.0158	0.1580	18.49	0.00079
330	0.0165	0.1650	19.07	0.00083
340	0.0179	0.1790	19.65	0.00090
350	0.0187	0.1870	20.22	0.00094
360	0.0195	0.1950	20.80	0.00098
370	0.0200	0.2000	21.38	0.00100
380	0.0210	0.2100	21.96	0.00105
390	0.0220	0.2200	22.54	0.00110
400	0.0230	0.2300	23.11	0.00115

Analisa Modulus Elastisitas

RC-N4-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0021	0.0210	2.31	0.00011
50	0.0025	0.0250	2.89	0.00013
60	0.0029	0.0290	3.47	0.00015
70	0.0033	0.0330	4.04	0.00017
80	0.0037	0.0370	4.62	0.00019
90	0.0042	0.0420	5.20	0.00021
100	0.0047	0.0470	5.78	0.00024
110	0.0052	0.0520	6.36	0.00026
120	0.0056	0.0560	6.93	0.00028
130	0.0062	0.0620	7.51	0.00031
140	0.0068	0.0680	8.09	0.00034
150	0.0073	0.0730	8.67	0.00037
160	0.0077	0.0770	9.25	0.00039
170	0.0083	0.0830	9.82	0.00042
180	0.0088	0.0880	10.40	0.00044
190	0.0094	0.0940	10.98	0.00047
200	0.0099	0.0990	11.56	0.00050
210	0.0104	0.1040	12.13	0.00052
220	0.0108	0.1080	12.71	0.00054
230	0.0113	0.1130	13.29	0.00057
240	0.0118	0.1180	13.87	0.00059
250	0.0123	0.1230	14.45	0.00062
260	0.0128	0.1280	15.02	0.00064
270	0.0134	0.1340	15.60	0.00067
280	0.0139	0.1390	16.18	0.00070
290	0.0144	0.1440	16.76	0.00072
300	0.0149	0.1490	17.33	0.00075
310	0.0154	0.1540	17.91	0.00077
320	0.0158	0.1580	18.49	0.00079
330	0.0165	0.1650	19.07	0.00083
340	0.0179	0.1790	19.65	0.00090
350	0.0187	0.1870	20.22	0.00094
360	0.0194	0.1940	20.80	0.00097
370	0.0199	0.1990	21.38	0.00100
380	0.0204	0.2040	21.96	0.00102
390	0.0213	0.2130	22.54	0.00107
400	0.0219	0.2190	23.11	0.00110
410	0.0230	0.2300	23.69	0.00115
420	0.0250	0.2500	24.27	0.00125
430	0.0258	0.2580	24.85	0.00129
440	0.0262	0.2620	25.42	0.00131
450	0.0271	0.2710	26.00	0.00136
460	0.0290	0.2900	26.58	0.00145
470	0.0299	0.2990	27.16	0.00150
480	0.0310	0.3100	27.74	0.00155
490	0.0330	0.3300	28.31	0.00165
500	0.0339	0.3390	28.89	0.00170
510	0.0350	0.3500	29.47	0.00175
520	0.0370	0.3700	30.05	0.00185
530	0.0380	0.3800	30.63	0.00190
540	0.0390	0.3900	31.20	0.00195
550	0.0400	0.4000	31.78	0.00200

Analisa Modulus Elastisitas

RC-N5-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0025	0.0250	2.89	0.00013
60	0.0030	0.0300	3.47	0.00015
70	0.0035	0.0350	4.04	0.00018
80	0.0040	0.0400	4.62	0.00020
90	0.0045	0.0450	5.20	0.00023
100	0.0050	0.0500	5.78	0.00025
110	0.0055	0.0550	6.36	0.00028
120	0.0060	0.0600	6.93	0.00030
130	0.0065	0.0650	7.51	0.00033
140	0.0070	0.0700	8.09	0.00035
150	0.0075	0.0750	8.67	0.00038
160	0.0080	0.0800	9.25	0.00040
170	0.0085	0.0850	9.82	0.00043
180	0.0090	0.0900	10.40	0.00045
190	0.0095	0.0950	10.98	0.00048
200	0.0100	0.1000	11.56	0.00050
210	0.0105	0.1050	12.13	0.00053
220	0.0109	0.1090	12.71	0.00055
230	0.0113	0.1130	13.29	0.00057
240	0.0118	0.1180	13.87	0.00059
250	0.0122	0.1220	14.45	0.00061
260	0.0127	0.1270	15.02	0.00064
270	0.0132	0.1320	15.60	0.00066
280	0.0136	0.1360	16.18	0.00068
290	0.0139	0.1390	16.76	0.00070
300	0.0143	0.1430	17.33	0.00072
310	0.0147	0.1470	17.91	0.00074
320	0.0151	0.1510	18.49	0.00076
330	0.0155	0.1550	19.07	0.00078
340	0.0159	0.1590	19.65	0.00080
350	0.0163	0.1630	20.22	0.00082
360	0.0168	0.1680	20.80	0.00084
370	0.0172	0.1720	21.38	0.00086
380	0.0177	0.1770	21.96	0.00089
390	0.0184	0.1840	22.54	0.00092
400	0.0192	0.1920	23.11	0.00096
410	0.0197	0.1970	23.69	0.00099
420	0.0203	0.2030	24.27	0.00102
430	0.0208	0.2080	24.85	0.00104
440	0.0213	0.2130	25.42	0.00107
450	0.0219	0.2190	26.00	0.00110
460	0.0224	0.2240	26.58	0.00112
470	0.0230	0.2300	27.16	0.00115
480	0.0240	0.2400	27.74	0.00120
490	0.0248	0.2480	28.31	0.00124
500	0.0253	0.2530	28.89	0.00127
510	0.0260	0.2600	29.47	0.00130
520	0.0280	0.2800	30.05	0.00140
530	0.0289	0.2890	30.63	0.00145
540	0.0300	0.3000	31.20	0.00150
550	0.0309	0.3090	31.78	0.00155
560	0.0317	0.3170	32.36	0.00159
570	0.0324	0.3240	32.94	0.00162
580	0.0340	0.3400	33.51	0.00170
590	0.0348	0.3480	34.09	0.00174
600	0.0355	0.3550	34.67	0.00178
610	0.0368	0.3680	35.25	0.00184
620	0.0375	0.3750	35.83	0.00188
630	0.0390	0.3900	36.40	0.00195

640	0.0397	0.3970	36.98	0.00199
650	0.0410	0.4100	37.56	0.00205
660	0.0415	0.4150	38.14	0.00208
670	0.0450	0.4500	38.71	0.00225
680	0.0458	0.4580	39.29	0.00229
690	0.0470	0.4700	39.87	0.00235
695	0.0510	0.5100	40.16	0.00255

Analisa Modulus Elastisitas

RC-N5-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0010	0.0100	0.58	0.00005
20	0.0020	0.0200	1.16	0.00010
30	0.0030	0.0300	1.73	0.00015
40	0.0037	0.0370	2.31	0.00019
50	0.0044	0.0440	2.89	0.00022
60	0.0049	0.0490	3.47	0.00025
70	0.0055	0.0550	4.04	0.00028
80	0.0059	0.0590	4.62	0.00030
90	0.0064	0.0640	5.20	0.00032
100	0.0069	0.0690	5.78	0.00035
110	0.0075	0.0750	6.36	0.00038
120	0.0079	0.0790	6.93	0.00040
130	0.0084	0.0840	7.51	0.00042
140	0.0089	0.0890	8.09	0.00045
150	0.0095	0.0950	8.67	0.00048
160	0.0103	0.1030	9.25	0.00052
170	0.0113	0.1130	9.82	0.00057
180	0.0120	0.1200	10.40	0.00060
190	0.0127	0.1270	10.98	0.00064
200	0.0134	0.1340	11.56	0.00067
210	0.0140	0.1400	12.13	0.00070
220	0.0150	0.1500	12.71	0.00075
230	0.0157	0.1570	13.29	0.00079
240	0.0165	0.1650	13.87	0.00083
250	0.0169	0.1690	14.45	0.00085
260	0.0175	0.1750	15.02	0.00088
270	0.0179	0.1790	15.60	0.00090
280	0.0185	0.1850	16.18	0.00093
290	0.0195	0.1950	16.76	0.00098
300	0.0200	0.2000	17.33	0.00100
310	0.0210	0.2100	17.91	0.00105
320	0.0218	0.2180	18.49	0.00109
330	0.0227	0.2270	19.07	0.00114
340	0.0233	0.2330	19.65	0.00117
350	0.0250	0.2500	20.22	0.00125
360	0.0257	0.2570	20.80	0.00129
370	0.0270	0.2700	21.38	0.00135
380	0.0277	0.2770	21.96	0.00139
390	0.0284	0.2840	22.54	0.00142
400	0.0290	0.2900	23.11	0.00145
410	0.0297	0.2970	23.69	0.00149
420	0.0310	0.3100	24.27	0.00155
430	0.0319	0.3190	24.85	0.00160
440	0.0330	0.3300	25.42	0.00165
450	0.0339	0.3390	26.00	0.00170
460	0.0350	0.3500	26.58	0.00175
470	0.0359	0.3590	27.16	0.00180
480	0.0370	0.3700	27.74	0.00185
490	0.0379	0.3790	28.31	0.00190
500	0.0385	0.3850	28.89	0.00193
510	0.0390	0.3900	29.47	0.00195
520	0.0398	0.3980	30.05	0.00199
530	0.0410	0.4100	30.63	0.00205
540	0.0418	0.4180	31.20	0.00209
550	0.0430	0.4300	31.78	0.00215
560	0.0439	0.4390	32.36	0.00220
570	0.0445	0.4450	32.94	0.00223
580	0.0452	0.4520	33.51	0.00226
590	0.0459	0.4590	34.09	0.00230
600	0.0467	0.4670	34.67	0.00234
610	0.0472	0.4720	35.25	0.00236
620	0.0479	0.4790	35.83	0.00240
630	0.0484	0.4840	36.40	0.00242

640	0.0489	0.4890	36.98	0.00245
650	0.0494	0.4940	37.56	0.00247
660	0.0502	0.5020	38.14	0.00251
670	0.0510	0.5100	38.71	0.00255
680	0.0519	0.5190	39.29	0.00260
690	0.0524	0.5240	39.87	0.00262
700	0.0530	0.5300	40.45	0.00265
710	0.0536	0.5360	41.03	0.00268
720	0.0550	0.5500	41.60	0.00275
730	0.0558	0.5580	42.18	0.00279
740	0.0564	0.5640	42.76	0.00282
750	0.0580	0.5800	43.34	0.00290
756	0.0580	0.5800	43.68	0.00290

Analisa Modulus Elastisitas

RC-N6-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0025	0.0250	2.89	0.00013
60	0.0030	0.0300	3.47	0.00015
70	0.0034	0.0340	4.04	0.00017
80	0.0038	0.0380	4.62	0.00019
90	0.0042	0.0420	5.20	0.00021
100	0.0045	0.0450	5.78	0.00023
110	0.0047	0.0470	6.36	0.00024
120	0.0050	0.0500	6.93	0.00025
130	0.0052	0.0520	7.51	0.00026
140	0.0054	0.0540	8.09	0.00027
150	0.0056	0.0560	8.67	0.00028
160	0.0058	0.0580	9.25	0.00029
170	0.0058	0.0580	9.82	0.00029
180	0.0059	0.0590	10.40	0.00030
190	0.0060	0.0600	10.98	0.00030
200	0.0061	0.0610	11.56	0.00031
210	0.0062	0.0620	12.13	0.00031
220	0.0063	0.0630	12.71	0.00032
230	0.0064	0.0640	13.29	0.00032
240	0.0065	0.0650	13.87	0.00033
250	0.0066	0.0660	14.45	0.00033
260	0.0067	0.0670	15.02	0.00034
270	0.0068	0.0680	15.60	0.00034
280	0.0070	0.0700	16.18	0.00035
290	0.0072	0.0720	16.76	0.00036
300	0.0074	0.0740	17.33	0.00037
310	0.0080	0.0800	17.91	0.00040
320	0.0083	0.0830	18.49	0.00042
330	0.0085	0.0850	19.07	0.00043
340	0.0090	0.0900	19.65	0.00045
350	0.0093	0.0930	20.22	0.00047
360	0.0095	0.0950	20.80	0.00048
370	0.0097	0.0970	21.38	0.00049
380	0.0100	0.1000	21.96	0.00050
390	0.0104	0.1040	22.54	0.00052
400	0.0107	0.1070	23.11	0.00054
410	0.0110	0.1100	23.69	0.00055
420	0.0114	0.1140	24.27	0.00057
430	0.0118	0.1180	24.85	0.00059
440	0.0122	0.1220	25.42	0.00061
450	0.0126	0.1260	26.00	0.00063
460	0.0129	0.1290	26.58	0.00065
470	0.0133	0.1330	27.16	0.00067
480	0.0136	0.1360	27.74	0.00068
490	0.0140	0.1400	28.31	0.00070
500	0.0144	0.1440	28.89	0.00072
510	0.0150	0.1500	29.47	0.00075
520	0.0155	0.1550	30.05	0.00078
530	0.0160	0.1600	30.63	0.00080
540	0.0165	0.1650	31.20	0.00083
550	0.0169	0.1690	31.78	0.00085
560	0.0173	0.1730	32.36	0.00087
570	0.0176	0.1760	32.94	0.00088
580	0.0180	0.1800	33.51	0.00090
590	0.0190	0.1900	34.09	0.00095
600	0.0200	0.2000	34.67	0.00100
610	0.0205	0.2050	35.25	0.00103
620	0.0210	0.2100	35.83	0.00105
630	0.0220	0.2200	36.40	0.00110

640	0.0240	0.2400	36.98	0.00120
650	0.0245	0.2450	37.56	0.00123
660	0.0260	0.2600	38.14	0.00130
670	0.0280	0.2800	38.71	0.00140
680	0.0300	0.3000	39.29	0.00150
690	0.0320	0.3200	39.87	0.00160
700	0.0340	0.3400	40.45	0.00170
710	0.0380	0.3800	41.03	0.00190
720	0.0400	0.4000	41.60	0.00200
723	0.0420	0.4200	41.78	0.00210

Analisa Modulus Elastisitas

RC-N6-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0010	0.0100	0.58	0.00005
20	0.0020	0.0200	1.16	0.00010
30	0.0028	0.0280	1.73	0.00014
40	0.0035	0.0350	2.31	0.00018
50	0.0040	0.0400	2.89	0.00020
60	0.0044	0.0440	3.47	0.00022
70	0.0048	0.0480	4.04	0.00024
80	0.0052	0.0520	4.62	0.00026
90	0.0056	0.0560	5.20	0.00028
100	0.0059	0.0590	5.78	0.00030
110	0.0062	0.0620	6.36	0.00031
120	0.0067	0.0670	6.93	0.00034
130	0.0071	0.0710	7.51	0.00036
140	0.0076	0.0760	8.09	0.00038
150	0.0080	0.0800	8.67	0.00040
160	0.0084	0.0840	9.25	0.00042
170	0.0090	0.0900	9.82	0.00045
180	0.0095	0.0950	10.40	0.00048
190	0.0100	0.1000	10.98	0.00050
200	0.0105	0.1050	11.56	0.00053
210	0.0110	0.1100	12.13	0.00055
220	0.0115	0.1150	12.71	0.00058
230	0.0120	0.1200	13.29	0.00060
240	0.0125	0.1250	13.87	0.00063
250	0.0130	0.1300	14.45	0.00065
260	0.0135	0.1350	15.02	0.00068
270	0.0139	0.1390	15.60	0.00070
280	0.0145	0.1450	16.18	0.00073
290	0.0150	0.1500	16.76	0.00075
300	0.0155	0.1550	17.33	0.00078
310	0.0160	0.1600	17.91	0.00080
320	0.0170	0.1700	18.49	0.00085
330	0.0175	0.1750	19.07	0.00088
340	0.0180	0.1800	19.65	0.00090
350	0.0190	0.1900	20.22	0.00095
360	0.0195	0.1950	20.80	0.00098
370	0.0200	0.2000	21.38	0.00100
380	0.0205	0.2050	21.96	0.00103
390	0.0210	0.2100	22.54	0.00105
400	0.0215	0.2150	23.11	0.00108
410	0.0220	0.2200	23.69	0.00110
420	0.0225	0.2250	24.27	0.00113
430	0.0230	0.2300	24.85	0.00115
440	0.0235	0.2350	25.42	0.00118
450	0.0240	0.2400	26.00	0.00120
460	0.0250	0.2500	26.58	0.00125
470	0.0255	0.2550	27.16	0.00128
480	0.0260	0.2600	27.74	0.00130
490	0.0265	0.2650	28.31	0.00133
500	0.0270	0.2700	28.89	0.00135
510	0.0275	0.2750	29.47	0.00138
521	0.0280	0.2800	30.11	0.00140

Analisa Modulus Elastisitas

RC-N7-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0010	0.0100	0.58	0.00005
20	0.0020	0.0200	1.16	0.00010
30	0.0030	0.0300	1.73	0.00015
40	0.0035	0.0350	2.31	0.00018
50	0.0040	0.0400	2.89	0.00020
60	0.0050	0.0500	3.47	0.00025
70	0.0055	0.0550	4.04	0.00028
80	0.0060	0.0600	4.62	0.00030
90	0.0070	0.0700	5.20	0.00035
100	0.0075	0.0750	5.78	0.00038
110	0.0080	0.0800	6.36	0.00040
120	0.0090	0.0900	6.93	0.00045
130	0.0095	0.0950	7.51	0.00048
140	0.0100	0.1000	8.09	0.00050
150	0.0105	0.1050	8.67	0.00053
160	0.0110	0.1100	9.25	0.00055
170	0.0130	0.1300	9.82	0.00065
180	0.0135	0.1350	10.40	0.00068
190	0.0145	0.1450	10.98	0.00073
200	0.0150	0.1500	11.56	0.00075
210	0.0160	0.1600	12.13	0.00080
220	0.0165	0.1650	12.71	0.00083
230	0.0170	0.1700	13.29	0.00085
240	0.0175	0.1750	13.87	0.00088
250	0.0179	0.1790	14.45	0.00090
260	0.0185	0.1850	15.02	0.00093
270	0.0190	0.1900	15.60	0.00095
280	0.0195	0.1950	16.18	0.00098
290	0.0200	0.2000	16.76	0.00100
300	0.0205	0.2050	17.33	0.00103
310	0.0210	0.2100	17.91	0.00105
320	0.0215	0.2150	18.49	0.00108
330	0.0220	0.2200	19.07	0.00110
340	0.0225	0.2250	19.65	0.00113
350	0.0229	0.2290	20.22	0.00115
360	0.0235	0.2350	20.80	0.00118
370	0.0240	0.2400	21.38	0.00120
380	0.0245	0.2450	21.96	0.00123
390	0.0250	0.2500	22.54	0.00125
400	0.0255	0.2550	23.11	0.00128
410	0.0259	0.2590	23.69	0.00130
420	0.0264	0.2640	24.27	0.00132
430	0.0268	0.2680	24.85	0.00134
440	0.0280	0.2800	25.42	0.00140
450	0.0285	0.2850	26.00	0.00143
460	0.0290	0.2900	26.58	0.00145
470	0.0300	0.3000	27.16	0.00150
480	0.0320	0.3200	27.74	0.00160
490	0.0325	0.3250	28.31	0.00163
500	0.0330	0.3300	28.89	0.00165
510	0.0340	0.3400	29.47	0.00170
520	0.0350	0.3500	30.05	0.00175
530	0.0360	0.3600	30.63	0.00180
540	0.0370	0.3700	31.20	0.00185
550	0.0390	0.3900	31.78	0.00195
560	0.0400	0.4000	32.36	0.00200
570	0.0420	0.4200	32.94	0.00210
580	0.0440	0.4400	33.51	0.00220
590	0.0450	0.4500	34.09	0.00225
600	0.0460	0.4600	34.67	0.00230
610	0.0470	0.4700	35.25	0.00235
620	0.0490	0.4900	35.83	0.00245
630	0.0500	0.5000	36.40	0.00250

640	0.0510	0.5100	36.98	0.00255
650	0.0520	0.5200	37.56	0.00260
660	0.0550	0.5500	38.14	0.00275
671	0.0600	0.6000	38.77	0.00300

Analisa Modulus Elastisitas

RC-N7-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0003	0.0030	0.58	0.00002
20	0.0007	0.0070	1.16	0.00004
30	0.0010	0.0100	1.73	0.00005
40	0.0013	0.0130	2.31	0.00007
50	0.0016	0.0160	2.89	0.00008
60	0.0019	0.0190	3.47	0.00010
70	0.0024	0.0240	4.04	0.00012
80	0.0028	0.0280	4.62	0.00014
90	0.0032	0.0320	5.20	0.00016
100	0.0035	0.0350	5.78	0.00018
110	0.0038	0.0380	6.36	0.00019
120	0.0041	0.0410	6.93	0.00021
130	0.0043	0.0430	7.51	0.00022
140	0.0045	0.0450	8.09	0.00023
150	0.0047	0.0470	8.67	0.00024
160	0.0049	0.0490	9.25	0.00025
170	0.0050	0.0500	9.82	0.00025
180	0.0052	0.0520	10.40	0.00026
190	0.0054	0.0540	10.98	0.00027
200	0.0056	0.0560	11.56	0.00028
210	0.0058	0.0580	12.13	0.00029
220	0.0060	0.0600	12.71	0.00030
230	0.0062	0.0620	13.29	0.00031
240	0.0064	0.0640	13.87	0.00032
250	0.0070	0.0700	14.45	0.00035
260	0.0075	0.0750	15.02	0.00038
270	0.0080	0.0800	15.60	0.00040
280	0.0085	0.0850	16.18	0.00043
290	0.0089	0.0890	16.76	0.00045
300	0.0093	0.0930	17.33	0.00047
310	0.0096	0.0960	17.91	0.00048
320	0.0098	0.0980	18.49	0.00049
330	0.0102	0.1020	19.07	0.00051
340	0.0105	0.1050	19.65	0.00053
350	0.0107	0.1070	20.22	0.00054
360	0.0110	0.1100	20.80	0.00055
370	0.0113	0.1130	21.38	0.00057
380	0.0116	0.1160	21.96	0.00058
390	0.0122	0.1220	22.54	0.00061
400	0.0126	0.1260	23.11	0.00063
410	0.0130	0.1300	23.69	0.00065
420	0.0135	0.1350	24.27	0.00068
430	0.0138	0.1380	24.85	0.00069
440	0.0142	0.1420	25.42	0.00071
450	0.0145	0.1450	26.00	0.00073
460	0.0150	0.1500	26.58	0.00075
470	0.0155	0.1550	27.16	0.00078
480	0.0160	0.1600	27.74	0.00080
490	0.0165	0.1650	28.31	0.00083
500	0.0170	0.1700	28.89	0.00085
510	0.0175	0.1750	29.47	0.00088
520	0.0178	0.1780	30.05	0.00089
530	0.0185	0.1850	30.63	0.00093
540	0.0190	0.1900	31.20	0.00095
550	0.0200	0.2000	31.78	0.00100
560	0.0210	0.2100	32.36	0.00105
570	0.0215	0.2150	32.94	0.00108
580	0.0225	0.2250	33.51	0.00113
590	0.0230	0.2300	34.09	0.00115
600	0.0250	0.2500	34.67	0.00125
610	0.0255	0.2550	35.25	0.00128
620	0.0265	0.2650	35.83	0.00133
630	0.0270	0.2700	36.40	0.00135

640	0.0300	0.3000	36.98	0.00150
652	0.0330	0.3300	37.67	0.00165

Analisa Modulus Elastisitas

RC-N8-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0017	0.0170	2.31	0.00009
50	0.0019	0.0190	2.89	0.00010
60	0.0022	0.0220	3.47	0.00011
70	0.0024	0.0240	4.04	0.00012
80	0.0027	0.0270	4.62	0.00014
90	0.0029	0.0290	5.20	0.00015
100	0.0032	0.0320	5.78	0.00016
110	0.0034	0.0340	6.36	0.00017
120	0.0037	0.0370	6.93	0.00019
130	0.0040	0.0400	7.51	0.00020
140	0.0042	0.0420	8.09	0.00021
150	0.0045	0.0450	8.67	0.00023
160	0.0047	0.0470	9.25	0.00024
170	0.0050	0.0500	9.82	0.00025
180	0.0052	0.0520	10.40	0.00026
190	0.0056	0.0560	10.98	0.00028
200	0.0058	0.0580	11.56	0.00029
210	0.0062	0.0620	12.13	0.00031
220	0.0064	0.0640	12.71	0.00032
230	0.0066	0.0660	13.29	0.00033
240	0.0068	0.0680	13.87	0.00034
250	0.0072	0.0720	14.45	0.00036
260	0.0075	0.0750	15.02	0.00038
270	0.0078	0.0780	15.60	0.00039
280	0.0082	0.0820	16.18	0.00041
290	0.0084	0.0840	16.76	0.00042
300	0.0087	0.0870	17.33	0.00044
310	0.0088	0.0880	17.91	0.00044
320	0.0093	0.0930	18.49	0.00047
330	0.0095	0.0950	19.07	0.00048
340	0.0097	0.0970	19.65	0.00049
350	0.0098	0.0980	20.22	0.00049
360	0.0105	0.1050	20.80	0.00053
370	0.0107	0.1070	21.38	0.00054
380	0.0108	0.1080	21.96	0.00054
390	0.0115	0.1150	22.54	0.00058
400	0.0117	0.1170	23.11	0.00059
410	0.0120	0.1200	23.69	0.00060
420	0.0124	0.1240	24.27	0.00062
430	0.0126	0.1260	24.85	0.00063
440	0.0130	0.1300	25.42	0.00065
450	0.0134	0.1340	26.00	0.00067
460	0.0144	0.1440	26.58	0.00072
470	0.0146	0.1460	27.16	0.00073
480	0.0154	0.1540	27.74	0.00077
490	0.0156	0.1560	28.31	0.00078
500	0.0164	0.1640	28.89	0.00082
510	0.0174	0.1740	29.47	0.00087
520	0.0175	0.1750	30.05	0.00088
530	0.0185	0.1850	30.63	0.00093
540	0.0187	0.1870	31.20	0.00094
550	0.0205	0.2050	31.78	0.00103
560	0.0207	0.2070	32.36	0.00104
570	0.0225	0.2250	32.94	0.00113
580	0.0226	0.2260	33.51	0.00113
590	0.0245	0.2450	34.09	0.00123
600	0.0247	0.2470	34.67	0.00124
610	0.0264	0.2640	35.25	0.00132
620	0.0268	0.2680	35.83	0.00134
630	0.0305	0.3050	36.40	0.00153

640	0.0307	0.3070	36.98	0.00154
650	0.0325	0.3250	37.56	0.00163

Analisa Modulus Elastisitas

RC-N8-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0005	0.0050	1.16	0.00003
30	0.0012	0.0120	1.73	0.00006
40	0.0015	0.0150	2.31	0.00008
50	0.0023	0.0230	2.89	0.00012
60	0.0025	0.0250	3.47	0.00013
70	0.0027	0.0270	4.04	0.00014
80	0.0032	0.0320	4.62	0.00016
90	0.0036	0.0360	5.20	0.00018
100	0.0042	0.0420	5.78	0.00021
110	0.0045	0.0450	6.36	0.00023
120	0.0047	0.0470	6.93	0.00024
130	0.0052	0.0520	7.51	0.00026
140	0.0054	0.0540	8.09	0.00027
150	0.0057	0.0570	8.67	0.00029
160	0.0062	0.0620	9.25	0.00031
170	0.0065	0.0650	9.82	0.00033
180	0.0068	0.0680	10.40	0.00034
190	0.0072	0.0720	10.98	0.00036
200	0.0075	0.0750	11.56	0.00038
210	0.0076	0.0760	12.13	0.00038
220	0.0083	0.0830	12.71	0.00042
230	0.0085	0.0850	13.29	0.00043
240	0.0087	0.0870	13.87	0.00044
250	0.0093	0.0930	14.45	0.00047
260	0.0097	0.0970	15.02	0.00049
270	0.0098	0.0980	15.60	0.00049
280	0.0102	0.1020	16.18	0.00051
290	0.0105	0.1050	16.76	0.00053
300	0.0107	0.1070	17.33	0.00054
310	0.0113	0.1130	17.91	0.00057
320	0.0115	0.1150	18.49	0.00058
330	0.0117	0.1170	19.07	0.00059
340	0.0124	0.1240	19.65	0.00062
350	0.0126	0.1260	20.22	0.00063
360	0.0128	0.1280	20.80	0.00064
370	0.0132	0.1320	21.38	0.00066
380	0.0135	0.1350	21.96	0.00068
390	0.0137	0.1370	22.54	0.00069
400	0.0142	0.1420	23.11	0.00071
410	0.0145	0.1450	23.69	0.00073
420	0.0153	0.1530	24.27	0.00077
430	0.0156	0.1560	24.85	0.00078
440	0.0163	0.1630	25.42	0.00082
450	0.0165	0.1650	26.00	0.00083
460	0.0167	0.1670	26.58	0.00084
470	0.0172	0.1720	27.16	0.00086
480	0.0176	0.1760	27.74	0.00088
490	0.0183	0.1830	28.31	0.00092
500	0.0194	0.1940	28.89	0.00097
510	0.0197	0.1970	29.47	0.00099
520	0.0203	0.2030	30.05	0.00102
530	0.0205	0.2050	30.63	0.00103
540	0.0225	0.2250	31.20	0.00113
550	0.0227	0.2270	31.78	0.00114
560	0.0243	0.2430	32.36	0.00122
570	0.0246	0.2460	32.94	0.00123
580	0.0248	0.2480	33.51	0.00124
590	0.0263	0.2630	34.09	0.00132
600	0.0285	0.2850	34.67	0.00143
610	0.0287	0.2870	35.25	0.00144
620	0.0304	0.3040	35.83	0.00152
630	0.0306	0.3060	36.40	0.00153

640	0.0324	0.3240	36.98	0.00162
650	0.0343	0.3430	37.56	0.00172
660	0.0364	0.3640	38.14	0.00182
670	0.0386	0.3860	38.71	0.00193
680	0.0406	0.4060	39.29	0.00203
690	0.0488	0.4880	39.87	0.00244

Analisa Modulus Elastisitas

RC-N9-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0003	0.0030	0.58	0.00002
20	0.0006	0.0060	1.16	0.00003
30	0.0012	0.0120	1.73	0.00006
40	0.0015	0.0150	2.31	0.00008
50	0.0017	0.0170	2.89	0.00009
60	0.0018	0.0180	3.47	0.00009
70	0.0019	0.0190	4.04	0.00010
80	0.0022	0.0220	4.62	0.00011
90	0.0024	0.0240	5.20	0.00012
100	0.0026	0.0260	5.78	0.00013
110	0.0028	0.0280	6.36	0.00014
120	0.0029	0.0290	6.93	0.00015
130	0.0032	0.0320	7.51	0.00016
140	0.0034	0.0340	8.09	0.00017
150	0.0036	0.0360	8.67	0.00018
160	0.0037	0.0370	9.25	0.00019
170	0.0042	0.0420	9.82	0.00021
180	0.0045	0.0450	10.40	0.00023
190	0.0047	0.0470	10.98	0.00024
200	0.0048	0.0480	11.56	0.00024
210	0.0049	0.0490	12.13	0.00025
220	0.0053	0.0530	12.71	0.00027
230	0.0056	0.0560	13.29	0.00028
240	0.0058	0.0580	13.87	0.00029
250	0.0063	0.0630	14.45	0.00032
260	0.0065	0.0650	15.02	0.00033
270	0.0067	0.0670	15.60	0.00034
280	0.0073	0.0730	16.18	0.00037
290	0.0075	0.0750	16.76	0.00038
300	0.0083	0.0830	17.33	0.00042
310	0.0085	0.0850	17.91	0.00043
320	0.0093	0.0930	18.49	0.00047
330	0.0095	0.0950	19.07	0.00048
340	0.0102	0.1020	19.65	0.00051
350	0.0105	0.1050	20.22	0.00053
360	0.0114	0.1140	20.80	0.00057
370	0.0116	0.1160	21.38	0.00058
380	0.0124	0.1240	21.96	0.00062
390	0.0127	0.1270	22.54	0.00064
400	0.0135	0.1350	23.11	0.00068
410	0.0154	0.1540	23.69	0.00077
420	0.0156	0.1560	24.27	0.00078
430	0.0157	0.1570	24.85	0.00079
440	0.0164	0.1640	25.42	0.00082
450	0.0166	0.1660	26.00	0.00083
460	0.0184	0.1840	26.58	0.00092
470	0.0187	0.1870	27.16	0.00094
480	0.0202	0.2020	27.74	0.00101
490	0.0205	0.2050	28.31	0.00103
500	0.0215	0.2150	28.89	0.00108
510	0.0236	0.2360	29.47	0.00118
520	0.0237	0.2370	30.05	0.00119
530	0.0256	0.2560	30.63	0.00128
540	0.0258	0.2580	31.20	0.00129
550	0.0264	0.2640	31.78	0.00132
560	0.0285	0.2850	32.36	0.00143
570	0.0287	0.2870	32.94	0.00144
580	0.0304	0.3040	33.51	0.00152
590	0.0306	0.3060	34.09	0.00153
600	0.0325	0.3250	34.67	0.00163
610	0.0345	0.3450	35.25	0.00173
620	0.0366	0.3660	35.83	0.00183
630	0.0367	0.3670	36.40	0.00184

640	0.0386	0.3860	36.98	0.00193
650	0.0402	0.4020	37.56	0.00201
660	0.0446	0.4460	38.14	0.00223
670	0.0467	0.4670	38.71	0.00234

Analisa Modulus Elastisitas

RC-N9-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0004	0.0040	0.58	0.00002
20	0.0012	0.0120	1.16	0.00006
30	0.0015	0.0150	1.73	0.00008
40	0.0017	0.0170	2.31	0.00009
50	0.0018	0.0180	2.89	0.00009
60	0.0023	0.0230	3.47	0.00012
70	0.0025	0.0250	4.04	0.00013
80	0.0035	0.0350	4.62	0.00018
90	0.0037	0.0370	5.20	0.00019
100	0.0038	0.0380	5.78	0.00019
110	0.0039	0.0390	6.36	0.00020
120	0.0043	0.0430	6.93	0.00022
130	0.0046	0.0460	7.51	0.00023
140	0.0048	0.0480	8.09	0.00024
150	0.0049	0.0490	8.67	0.00025
160	0.0052	0.0520	9.25	0.00026
170	0.0054	0.0540	9.82	0.00027
180	0.0057	0.0570	10.40	0.00029
190	0.0063	0.0630	10.98	0.00032
200	0.0073	0.0730	11.56	0.00037
210	0.0075	0.0750	12.13	0.00038
220	0.0086	0.0860	12.71	0.00043
230	0.0087	0.0870	13.29	0.00044
240	0.0089	0.0890	13.87	0.00045
250	0.0093	0.0930	14.45	0.00047
260	0.0204	0.2040	15.02	0.00102
270	0.0206	0.2060	15.60	0.00103
280	0.0214	0.2140	16.18	0.00107
290	0.0236	0.2360	16.76	0.00118
300	0.0238	0.2380	17.33	0.00119
310	0.0256	0.2560	17.91	0.00128
320	0.0278	0.2780	18.49	0.00139
330	0.0279	0.2790	19.07	0.00140
340	0.0316	0.3160	19.65	0.00158
350	0.0357	0.3570	20.22	0.00179
360	0.0426	0.4260	20.80	0.00213

Analisa Modulus Elastisitas

RC-N10-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0012	0.0120	0.58	0.00006
20	0.0014	0.0140	1.16	0.00007
30	0.0023	0.0230	1.73	0.00012
40	0.0034	0.0340	2.31	0.00017
50	0.0036	0.0360	2.89	0.00018
60	0.0042	0.0420	3.47	0.00021
70	0.0064	0.0640	4.04	0.00032
80	0.0066	0.0660	4.62	0.00033
90	0.0074	0.0740	5.20	0.00037
100	0.0085	0.0850	5.78	0.00043
110	0.0087	0.0870	6.36	0.00044
120	0.0094	0.0940	6.93	0.00047
130	0.0096	0.0960	7.51	0.00048
140	0.0098	0.0980	8.09	0.00049
150	0.0102	0.1020	8.67	0.00051
160	0.0105	0.1050	9.25	0.00053
170	0.0107	0.1070	9.82	0.00054
180	0.0124	0.1240	10.40	0.00062
190	0.0127	0.1270	10.98	0.00064
200	0.0129	0.1290	11.56	0.00065
210	0.0143	0.1430	12.13	0.00072
220	0.0146	0.1460	12.71	0.00073
230	0.0148	0.1480	13.29	0.00074
240	0.0149	0.1490	13.87	0.00075
250	0.0163	0.1630	14.45	0.00082
260	0.0165	0.1650	15.02	0.00083
270	0.0167	0.1670	15.60	0.00084
280	0.0183	0.1830	16.18	0.00092
290	0.0185	0.1850	16.76	0.00093
300	0.0204	0.2040	17.33	0.00102
310	0.0206	0.2060	17.91	0.00103
320	0.0208	0.2080	18.49	0.00104
330	0.0225	0.2250	19.07	0.00113
340	0.0226	0.2260	19.65	0.00113
350	0.0229	0.2290	20.22	0.00115
360	0.0243	0.2430	20.80	0.00122
370	0.0246	0.2460	21.38	0.00123
380	0.0248	0.2480	21.96	0.00124
390	0.0252	0.2520	22.54	0.00126
400	0.0254	0.2540	23.11	0.00127
410	0.0257	0.2570	23.69	0.00129
420	0.0259	0.2590	24.27	0.00130
430	0.0263	0.2633	24.85	0.00132
440	0.0272	0.2720	25.42	0.00136
450	0.0274	0.2740	26.00	0.00137
460	0.0276	0.2760	26.58	0.00138
470	0.0278	0.2780	27.16	0.00139
480	0.0282	0.2820	27.74	0.00141
490	0.0295	0.2950	28.31	0.00148
500	0.0296	0.2960	28.89	0.00148
510	0.0304	0.3040	29.47	0.00152
520	0.0308	0.3080	30.05	0.00154
530	0.0309	0.3090	30.63	0.00155
540	0.0314	0.3140	31.20	0.00157
550	0.0316	0.3160	31.78	0.00158
560	0.0318	0.3180	32.36	0.00159
570	0.0323	0.3230	32.94	0.00162
580	0.0325	0.3250	33.51	0.00163
590	0.0343	0.3430	34.09	0.00172
600	0.0346	0.3460	34.67	0.00173
610	0.0348	0.3480	35.25	0.00174
620	0.0349	0.3490	35.83	0.00175
630	0.0362	0.3620	36.40	0.00181

640	0.0364	0.3640	36.98	0.00182
650	0.0367	0.3670	37.56	0.00184
660	0.0382	0.3820	38.14	0.00191
670	0.0384	0.3840	38.71	0.00192
680	0.0403	0.4030	39.29	0.00202
690	0.0406	0.4060	39.87	0.00203
700	0.0425	0.4250	40.45	0.00213
710	0.0457	0.4570	41.03	0.00229

Analisa Modulus Elastisitas

RC-N10-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0012	0.0120	1.16	0.00006
30	0.0015	0.0150	1.73	0.00008
40	0.0023	0.0230	2.31	0.00012
50	0.0025	0.0250	2.89	0.00013
60	0.0034	0.0340	3.47	0.00017
70	0.0036	0.0360	4.04	0.00018
80	0.0042	0.0420	4.62	0.00021
90	0.0046	0.0460	5.20	0.00023
100	0.0052	0.0520	5.78	0.00026
110	0.0054	0.0540	6.36	0.00027
120	0.0062	0.0620	6.93	0.00031
130	0.0064	0.0640	7.51	0.00032
140	0.0074	0.0740	8.09	0.00037
150	0.0076	0.0760	8.67	0.00038
160	0.0078	0.0780	9.25	0.00039
170	0.0083	0.0830	9.82	0.00042
180	0.0085	0.0850	10.40	0.00043
190	0.0092	0.0920	10.98	0.00046
200	0.0095	0.0950	11.56	0.00048
210	0.0102	0.1020	12.13	0.00051
220	0.0104	0.1040	12.71	0.00052
230	0.0106	0.1060	13.29	0.00053
240	0.0113	0.1130	13.87	0.00057
250	0.0116	0.1160	14.45	0.00058
260	0.0123	0.1230	15.02	0.00062
270	0.0125	0.1250	15.60	0.00063
280	0.0134	0.1340	16.18	0.00067
290	0.0136	0.1360	16.76	0.00068
300	0.0143	0.1430	17.33	0.00072
310	0.0146	0.1460	17.91	0.00073
320	0.0148	0.1480	18.49	0.00074
330	0.0153	0.1530	19.07	0.00077
340	0.0156	0.1560	19.65	0.00078
350	0.0163	0.1630	20.22	0.00082
360	0.0173	0.1730	20.80	0.00087
370	0.0175	0.1750	21.38	0.00088
380	0.0184	0.1840	21.96	0.00092
390	0.0186	0.1860	22.54	0.00093
400	0.0188	0.1880	23.11	0.00094
410	0.0192	0.1920	23.69	0.00096
420	0.0196	0.1960	24.27	0.00098
430	0.0202	0.2020	24.85	0.00101
440	0.0214	0.2140	25.42	0.00107
450	0.0226	0.2260	26.00	0.00113
460	0.0228	0.2280	26.58	0.00114
470	0.0234	0.2340	27.16	0.00117
480	0.0236	0.2360	27.74	0.00118
490	0.0243	0.2430	28.31	0.00122
500	0.0253	0.2530	28.89	0.00127
510	0.0264	0.2640	29.47	0.00132
520	0.0285	0.2850	30.05	0.00143
530	0.0287	0.2870	30.63	0.00144
540	0.0302	0.3020	31.20	0.00151
550	0.0304	0.3040	31.78	0.00152
560	0.0324	0.3240	32.36	0.00162
570	0.0326	0.3260	32.94	0.00163
580	0.0345	0.3450	33.51	0.00173
590	0.0347	0.3470	34.09	0.00174
600	0.0353	0.3530	34.67	0.00177
610	0.0356	0.3560	35.25	0.00178
620	0.0375	0.3750	35.83	0.00188
630	0.0394	0.3940	36.40	0.00197

640	0.0396	0.3960	36.98	0.00198
650	0.0413	0.4130	37.56	0.00207
660	0.0415	0.4150	38.14	0.00208
670	0.0453	0.4530	38.71	0.00227
680	0.0456	0.4560	39.29	0.00228
690	0.0496	0.4960	39.87	0.00248

Analisa Modulus Elastisitas

RC-O1-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0012	0.0120	0.58	0.00006
20	0.0023	0.0230	1.16	0.00012
30	0.0026	0.0260	1.73	0.00013
40	0.0034	0.0340	2.31	0.00017
50	0.0045	0.0450	2.89	0.00023
60	0.0047	0.0470	3.47	0.00024
70	0.0053	0.0530	4.04	0.00027
80	0.0075	0.0750	4.62	0.00038
90	0.0077	0.0770	5.20	0.00039
100	0.0078	0.0780	5.78	0.00039
110	0.0083	0.0830	6.36	0.00042
120	0.0085	0.0850	6.93	0.00043
130	0.0102	0.1020	7.51	0.00051
140	0.0104	0.1040	8.09	0.00052
150	0.0112	0.1120	8.67	0.00056
160	0.0114	0.1140	9.25	0.00057
170	0.0116	0.1160	9.82	0.00058
180	0.0123	0.1230	10.40	0.00062
190	0.0145	0.1450	10.98	0.00073
200	0.0147	0.1470	11.56	0.00074
210	0.0148	0.1480	12.13	0.00074
220	0.0149	0.1490	12.71	0.00075
230	0.0165	0.1650	13.29	0.00083
240	0.0166	0.1660	13.87	0.00083
250	0.0167	0.1670	14.45	0.00084
260	0.0168	0.1680	15.02	0.00084
270	0.0169	0.1690	15.60	0.00085
280	0.0183	0.1830	16.18	0.00092
290	0.0185	0.1850	16.76	0.00093
300	0.0186	0.1860	17.33	0.00093
310	0.0202	0.2020	17.91	0.00101
320	0.0204	0.2040	18.49	0.00102
330	0.0206	0.2060	19.07	0.00103
340	0.0213	0.2130	19.65	0.00107
350	0.0215	0.2150	20.22	0.00108
360	0.0217	0.2170	20.80	0.00109
370	0.0232	0.2320	21.38	0.00116
380	0.0234	0.2340	21.96	0.00117
390	0.0236	0.2360	22.54	0.00118
400	0.0237	0.2370	23.11	0.00119
410	0.0252	0.2520	23.69	0.00126
420	0.0257	0.2570	24.27	0.00129
430	0.0258	0.2580	24.85	0.00129
440	0.0259	0.2590	25.42	0.00130
450	0.0264	0.2640	26.00	0.00132
460	0.0265	0.2650	26.58	0.00133
470	0.0266	0.2660	27.16	0.00133
480	0.0284	0.2840	27.74	0.00142
490	0.0286	0.2860	28.31	0.00143
500	0.0288	0.2880	28.89	0.00144
510	0.0302	0.3020	29.47	0.00151
520	0.0324	0.3240	30.05	0.00162
530	0.0326	0.3260	30.63	0.00163
540	0.0345	0.3450	31.20	0.00173
550	0.0364	0.3640	31.78	0.00182

Analisa Modulus Elastisitas

RC-O1-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0012	0.0120	0.58	0.00006
20	0.0014	0.0140	1.16	0.00007
30	0.0016	0.0160	1.73	0.00008
40	0.0023	0.0230	2.31	0.00012
50	0.0026	0.0260	2.89	0.00013
60	0.0032	0.0320	3.47	0.00016
70	0.0034	0.0340	4.04	0.00017
80	0.0036	0.0360	4.62	0.00018
90	0.0042	0.0420	5.20	0.00021
100	0.0045	0.0450	5.78	0.00023
110	0.0047	0.0470	6.36	0.00024
120	0.0052	0.0520	6.93	0.00026
130	0.0054	0.0540	7.51	0.00027
140	0.0072	0.0720	8.09	0.00036
150	0.0074	0.0740	8.67	0.00037
160	0.0076	0.0760	9.25	0.00038
170	0.0082	0.0820	9.82	0.00041
180	0.0084	0.0840	10.40	0.00042
190	0.0086	0.0860	10.98	0.00043
200	0.0102	0.1020	11.56	0.00051
210	0.0104	0.1040	12.13	0.00052
220	0.0106	0.1060	12.71	0.00053
230	0.0124	0.1240	13.29	0.00062
240	0.0126	0.1260	13.87	0.00063
250	0.0127	0.1270	14.45	0.00064
260	0.0128	0.1280	15.02	0.00064
270	0.0143	0.1430	15.60	0.00072
280	0.0145	0.1450	16.18	0.00073
290	0.0147	0.1470	16.76	0.00074
300	0.0163	0.1630	17.33	0.00082
310	0.0166	0.1660	17.91	0.00083
320	0.0182	0.1820	18.49	0.00091
330	0.0184	0.1840	19.07	0.00092
340	0.0186	0.1860	19.65	0.00093
350	0.0202	0.2020	20.22	0.00101
360	0.0204	0.2040	20.80	0.00102
370	0.0206	0.2060	21.38	0.00103
380	0.0223	0.2230	21.96	0.00112
390	0.0236	0.2360	22.54	0.00118
400	0.0243	0.2430	23.11	0.00122
410	0.0245	0.2450	23.69	0.00123
420	0.0263	0.2630	24.27	0.00132
430	0.0265	0.2650	24.85	0.00133
440	0.0267	0.2670	25.42	0.00134
450	0.0282	0.2820	26.00	0.00141
460	0.0302	0.3020	26.58	0.00151
470	0.0304	0.3040	27.16	0.00152
480	0.0332	0.3320	27.74	0.00166
490	0.0334	0.3340	28.31	0.00167
500	0.0336	0.3360	28.89	0.00168
510	0.0352	0.3520	29.47	0.00176
520	0.0354	0.3540	30.05	0.00177
530	0.0372	0.3720	30.63	0.00186
540	0.0393	0.3930	31.20	0.00197
550	0.0394	0.3940	31.78	0.00197
560	0.0396	0.3960	32.36	0.00198
570	0.0412	0.4120	32.94	0.00206
580	0.0432	0.4320	33.51	0.00216
590	0.0453	0.4530	34.09	0.00227
600	0.0455	0.4550	34.67	0.00228
610	0.0473	0.4730	35.25	0.00237
620	0.0475	0.4750	35.83	0.00238
630	0.0492	0.4920	36.40	0.00246

640	0.0534	0.5340	36.98	0.00267
650	0.0553	0.5530	37.56	0.00277

Analisa Modulus Elastisitas

RC-O2-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0012	0.0120	0.58	0.00006
20	0.0014	0.0140	1.16	0.00007
30	0.0016	0.0160	1.73	0.00008
40	0.0023	0.0230	2.31	0.00012
50	0.0025	0.0250	2.89	0.00013
60	0.0027	0.0270	3.47	0.00014
70	0.0032	0.0320	4.04	0.00016
80	0.0034	0.0340	4.62	0.00017
90	0.0036	0.0360	5.20	0.00018
100	0.0042	0.0420	5.78	0.00021
110	0.0045	0.0450	6.36	0.00023
120	0.0046	0.0460	6.93	0.00023
130	0.0048	0.0480	7.51	0.00024
140	0.0052	0.0520	8.09	0.00026
150	0.0054	0.0540	8.67	0.00027
160	0.0056	0.0560	9.25	0.00028
170	0.0062	0.0620	9.82	0.00031
180	0.0064	0.0640	10.40	0.00032
190	0.0066	0.0660	10.98	0.00033
200	0.0072	0.0720	11.56	0.00036
210	0.0074	0.0740	12.13	0.00037
220	0.0076	0.0760	12.71	0.00038
230	0.0078	0.0780	13.29	0.00039
240	0.0082	0.0820	13.87	0.00041
250	0.0084	0.0840	14.45	0.00042
260	0.0086	0.0860	15.02	0.00043
270	0.0094	0.0940	15.60	0.00047
280	0.0096	0.0960	16.18	0.00048
290	0.0098	0.0980	16.76	0.00049
300	0.0099	0.0990	17.33	0.00050
310	0.0102	0.1020	17.91	0.00051
320	0.0104	0.1040	18.49	0.00052
330	0.0106	0.1060	19.07	0.00053
340	0.0123	0.1230	19.65	0.00062
350	0.0125	0.1250	20.22	0.00063
360	0.0127	0.1270	20.80	0.00064
370	0.0128	0.1280	21.38	0.00064
380	0.0142	0.1420	21.96	0.00071
390	0.0144	0.1440	22.54	0.00072
400	0.0146	0.1460	23.11	0.00073
410	0.0148	0.1480	23.69	0.00074
420	0.0162	0.1620	24.27	0.00081
430	0.0164	0.1640	24.85	0.00082
440	0.0166	0.1660	25.42	0.00083
450	0.0182	0.1820	26.00	0.00091
460	0.0184	0.1840	26.58	0.00092
470	0.0202	0.2020	27.16	0.00101
480	0.0204	0.2040	27.74	0.00102
490	0.0206	0.2060	28.31	0.00103
500	0.0223	0.2230	28.89	0.00112
510	0.0225	0.2250	29.47	0.00113
520	0.0243	0.2430	30.05	0.00122
530	0.0245	0.2450	30.63	0.00123
540	0.0267	0.2670	31.20	0.00134
550	0.0283	0.2830	31.78	0.00142
560	0.0285	0.2850	32.36	0.00143
570	0.0324	0.3240	32.94	0.00162

Analisa Modulus Elastisitas

RC-02-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0012	0.0120	1.16	0.00006
30	0.0015	0.0150	1.73	0.00008
40	0.0017	0.0170	2.31	0.00009
50	0.0020	0.0200	2.89	0.00010
60	0.0025	0.0250	3.47	0.00013
70	0.0028	0.0280	4.04	0.00014
80	0.0032	0.0320	4.62	0.00016
90	0.0035	0.0350	5.20	0.00018
100	0.0038	0.0380	5.78	0.00019
110	0.0041	0.0410	6.36	0.00021
120	0.0044	0.0440	6.93	0.00022
130	0.0050	0.0500	7.51	0.00025
140	0.0055	0.0550	8.09	0.00028
150	0.0058	0.0580	8.67	0.00029
160	0.0062	0.0620	9.25	0.00031
170	0.0065	0.0650	9.82	0.00033
180	0.0068	0.0680	10.40	0.00034
190	0.0072	0.0720	10.98	0.00036
200	0.0075	0.0750	11.56	0.00038
210	0.0079	0.0790	12.13	0.00040
220	0.0082	0.0820	12.71	0.00041
230	0.0085	0.0850	13.29	0.00043
240	0.0088	0.0880	13.87	0.00044
250	0.0090	0.0900	14.45	0.00045
260	0.0092	0.0920	15.02	0.00046
270	0.0094	0.0940	15.60	0.00047
280	0.0100	0.1000	16.18	0.00050
290	0.0105	0.1050	16.76	0.00053
300	0.0107	0.1070	17.33	0.00054
310	0.0110	0.1100	17.91	0.00055
320	0.0114	0.1140	18.49	0.00057
330	0.0118	0.1180	19.07	0.00059
340	0.0122	0.1220	19.65	0.00061
350	0.0125	0.1250	20.22	0.00063
360	0.0128	0.1280	20.80	0.00064
370	0.0130	0.1300	21.38	0.00065
380	0.0140	0.1400	21.96	0.00070
390	0.0150	0.1500	22.54	0.00075
400	0.0155	0.1550	23.11	0.00078
410	0.0160	0.1600	23.69	0.00080
420	0.0163	0.1630	24.27	0.00082
430	0.0168	0.1680	24.85	0.00084
440	0.0172	0.1720	25.42	0.00086
450	0.0175	0.1750	26.00	0.00088
460	0.0178	0.1780	26.58	0.00089
470	0.0182	0.1820	27.16	0.00091
477	0.0187	0.1870	27.56	0.00094

Analisa Modulus Elastisitas

RC-O3-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0010	0.0100	0.58	0.00005
20	0.0015	0.0150	1.16	0.00008
30	0.0018	0.0180	1.73	0.00009
40	0.0022	0.0220	2.31	0.00011
50	0.0026	0.0260	2.89	0.00013
60	0.0030	0.0300	3.47	0.00015
70	0.0035	0.0350	4.04	0.00018
80	0.0038	0.0380	4.62	0.00019
90	0.0042	0.0420	5.20	0.00021
100	0.0045	0.0450	5.78	0.00023
110	0.0048	0.0480	6.36	0.00024
120	0.0052	0.0520	6.93	0.00026
130	0.0055	0.0550	7.51	0.00028
140	0.0058	0.0580	8.09	0.00029
150	0.0062	0.0620	8.67	0.00031
160	0.0065	0.0650	9.25	0.00033
170	0.0068	0.0680	9.82	0.00034
180	0.0072	0.0720	10.40	0.00036
190	0.0075	0.0750	10.98	0.00038
200	0.0077	0.0770	11.56	0.00039
210	0.0080	0.0800	12.13	0.00040
220	0.0084	0.0840	12.71	0.00042
230	0.0088	0.0880	13.29	0.00044
240	0.0092	0.0920	13.87	0.00046
250	0.0096	0.0960	14.45	0.00048
260	0.0102	0.1020	15.02	0.00051
270	0.0105	0.1050	15.60	0.00053
280	0.0110	0.1100	16.18	0.00055
290	0.0115	0.1150	16.76	0.00058
300	0.0119	0.1190	17.33	0.00060
310	0.0123	0.1230	17.91	0.00062
320	0.0125	0.1250	18.49	0.00063
330	0.0128	0.1280	19.07	0.00064
340	0.0132	0.1320	19.65	0.00066
350	0.0140	0.1400	20.22	0.00070
360	0.0145	0.1450	20.80	0.00073
370	0.0149	0.1490	21.38	0.00075
380	0.0153	0.1530	21.96	0.00077
390	0.0156	0.1560	22.54	0.00078
400	0.0158	0.1580	23.11	0.00079
410	0.0162	0.1620	23.69	0.00081
420	0.0165	0.1650	24.27	0.00083
430	0.0168	0.1680	24.85	0.00084
440	0.0172	0.1720	25.42	0.00086
450	0.0178	0.1780	26.00	0.00089
460	0.0182	0.1820	26.58	0.00091
470	0.0185	0.1850	27.16	0.00093
480	0.0188	0.1880	27.74	0.00094
490	0.0195	0.1950	28.31	0.00098
500	0.0202	0.2020	28.89	0.00101
510	0.0208	0.2080	29.47	0.00104
520	0.0215	0.2150	30.05	0.00108
530	0.0240	0.2400	30.63	0.00120
540	0.0245	0.2450	31.20	0.00123
550	0.0250	0.2500	31.78	0.00125
560	0.0255	0.2550	32.36	0.00128
570	0.0270	0.2700	32.94	0.00135
580	0.0280	0.2800	33.51	0.00140
590	0.0310	0.3100	34.09	0.00155
600	0.0350	0.3500	34.67	0.00175
606	0.0355	0.3550	35.02	0.00178

Analisa Modulus Elastisitas

RC-O3-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0012	0.0120	0.58	0.00006
20	0.0014	0.0140	1.16	0.00007
30	0.0023	0.0230	1.73	0.00012
40	0.0034	0.0340	2.31	0.00017
50	0.0036	0.0360	2.89	0.00018
60	0.0038	0.0380	3.47	0.00019
70	0.0043	0.0430	4.04	0.00022
80	0.0063	0.0630	4.62	0.00032
90	0.0073	0.0730	5.20	0.00037
100	0.0076	0.0760	5.78	0.00038
110	0.0078	0.0780	6.36	0.00039
120	0.0092	0.0920	6.93	0.00046
130	0.0112	0.1120	7.51	0.00056
140	0.0115	0.1150	8.09	0.00058
150	0.0116	0.1160	8.67	0.00058
160	0.0118	0.1180	9.25	0.00059
170	0.0132	0.1320	9.82	0.00066
180	0.0134	0.1340	10.40	0.00067
190	0.0152	0.1520	10.98	0.00076
200	0.0154	0.1540	11.56	0.00077
210	0.0173	0.1730	12.13	0.00087
220	0.0175	0.1750	12.71	0.00088
230	0.0178	0.1780	13.29	0.00089
240	0.0192	0.1920	13.87	0.00096
250	0.0194	0.1940	14.45	0.00097
260	0.0213	0.2130	15.02	0.00107
270	0.0215	0.2150	15.60	0.00108
280	0.0233	0.2330	16.18	0.00117
290	0.0235	0.2350	16.76	0.00118
300	0.0253	0.2530	17.33	0.00127
310	0.0255	0.2550	17.91	0.00128
320	0.0273	0.2730	18.49	0.00137
330	0.0275	0.2750	19.07	0.00138
340	0.0293	0.2930	19.65	0.00147
350	0.0295	0.2950	20.22	0.00148
360	0.0314	0.3140	20.80	0.00157
370	0.0315	0.3150	21.38	0.00158
380	0.0317	0.3170	21.96	0.00159
390	0.0334	0.3340	22.54	0.00167
400	0.0354	0.3540	23.11	0.00177
410	0.0356	0.3560	23.69	0.00178
420	0.0372	0.3720	24.27	0.00186
430	0.0374	0.3740	24.85	0.00187
440	0.0394	0.3940	25.42	0.00197
450	0.0412	0.4120	26.00	0.00206
460	0.0414	0.4140	26.58	0.00207
470	0.0432	0.4320	27.16	0.00216
480	0.0435	0.4350	27.74	0.00218
490	0.0453	0.4530	28.31	0.00227
500	0.0455	0.4550	28.89	0.00228
510	0.0492	0.4920	29.47	0.00246
520	0.0494	0.4940	30.05	0.00247
530	0.0523	0.5230	30.63	0.00262
540	0.0552	0.5520	31.20	0.00276

Analisa Modulus Elastisitas

RC-O4-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0012	0.0120	1.16	0.00006
30	0.0014	0.0140	1.73	0.00007
40	0.0016	0.0160	2.31	0.00008
50	0.0018	0.0180	2.89	0.00009
60	0.0019	0.0190	3.47	0.00010
70	0.0023	0.0230	4.04	0.00012
80	0.0025	0.0250	4.62	0.00013
90	0.0026	0.0260	5.20	0.00013
100	0.0032	0.0320	5.78	0.00016
110	0.0035	0.0350	6.36	0.00018
120	0.0037	0.0370	6.93	0.00019
130	0.0038	0.0380	7.51	0.00019
140	0.0039	0.0390	8.09	0.00020
150	0.0042	0.0420	8.67	0.00021
160	0.0045	0.0450	9.25	0.00023
170	0.0047	0.0470	9.82	0.00024
180	0.0048	0.0480	10.40	0.00024
190	0.0049	0.0490	10.98	0.00025
200	0.0052	0.0520	11.56	0.00026
210	0.0054	0.0540	12.13	0.00027
220	0.0056	0.0560	12.71	0.00028
230	0.0058	0.0580	13.29	0.00029
240	0.0062	0.0620	13.87	0.00031
250	0.0064	0.0640	14.45	0.00032
260	0.0066	0.0660	15.02	0.00033
270	0.0067	0.0670	15.60	0.00034
280	0.0068	0.0680	16.18	0.00034
290	0.0072	0.0720	16.76	0.00036
300	0.0074	0.0740	17.33	0.00037
310	0.0076	0.0760	17.91	0.00038
320	0.0082	0.0820	18.49	0.00041
330	0.0084	0.0840	19.07	0.00042
340	0.0086	0.0860	19.65	0.00043
350	0.0088	0.0880	20.22	0.00044
360	0.0092	0.0920	20.80	0.00046
370	0.0094	0.0940	21.38	0.00047
380	0.0096	0.0960	21.96	0.00048
390	0.0098	0.0980	22.54	0.00049
400	0.0099	0.0990	23.11	0.00050
410	0.0102	0.1020	23.69	0.00051
420	0.0104	0.1040	24.27	0.00052
430	0.0106	0.1060	24.85	0.00053
440	0.0108	0.1080	25.42	0.00054
450	0.0109	0.1090	26.00	0.00055
460	0.0112	0.1120	26.58	0.00056
470	0.0114	0.1140	27.16	0.00057
480	0.0123	0.1230	27.74	0.00062
490	0.0125	0.1250	28.31	0.00063
500	0.0127	0.1270	28.89	0.00064
510	0.0128	0.1280	29.47	0.00064
520	0.0142	0.1420	30.05	0.00071
530	0.0144	0.1440	30.63	0.00072
540	0.0148	0.1480	31.20	0.00074
550	0.0162	0.1620	31.78	0.00081
560	0.0164	0.1640	32.36	0.00082
570	0.0184	0.1840	32.94	0.00092
580	0.0186	0.1860	33.51	0.00093
590	0.0188	0.1880	34.09	0.00094
600	0.0204	0.2040	34.67	0.00102

Analisa Modulus Elastisitas

RC-O5-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0012	0.0120	1.16	0.00006
30	0.0014	0.0140	1.73	0.00007
40	0.0016	0.0160	2.31	0.00008
50	0.0018	0.0180	2.89	0.00009
60	0.0022	0.0220	3.47	0.00011
70	0.0025	0.0250	4.04	0.00013
80	0.0028	0.0280	4.62	0.00014
90	0.0029	0.0290	5.20	0.00015
100	0.0032	0.0320	5.78	0.00016
110	0.0034	0.0340	6.36	0.00017
120	0.0036	0.0360	6.93	0.00018
130	0.0043	0.0430	7.51	0.00022
140	0.0046	0.0460	8.09	0.00023
150	0.0047	0.0470	8.67	0.00024
160	0.0048	0.0480	9.25	0.00024
170	0.0049	0.0490	9.82	0.00025
180	0.0052	0.0520	10.40	0.00026
190	0.0054	0.0540	10.98	0.00027
200	0.0057	0.0570	11.56	0.00029
210	0.0062	0.0620	12.13	0.00031
220	0.0064	0.0640	12.71	0.00032
230	0.0067	0.0670	13.29	0.00034
240	0.0072	0.0720	13.87	0.00036
250	0.0074	0.0740	14.45	0.00037
260	0.0077	0.0770	15.02	0.00039
270	0.0079	0.0790	15.60	0.00040
280	0.0082	0.0820	16.18	0.00041
290	0.0102	0.1020	16.76	0.00051
300	0.0104	0.1040	17.33	0.00052
310	0.0106	0.1060	17.91	0.00053
320	0.0124	0.1240	18.49	0.00062
330	0.0126	0.1260	19.07	0.00063
340	0.0113	0.1129	19.65	0.00056
350	0.0142	0.1420	20.22	0.00071
360	0.0146	0.1460	20.80	0.00073
370	0.0162	0.1620	21.38	0.00081
380	0.0164	0.1640	21.96	0.00082
390	0.0166	0.1660	22.54	0.00083
400	0.0182	0.1820	23.11	0.00091
410	0.0184	0.1840	23.69	0.00092
420	0.0202	0.2020	24.27	0.00101
430	0.0204	0.2040	24.85	0.00102
440	0.0206	0.2060	25.42	0.00103
450	0.0224	0.2240	26.00	0.00112
460	0.0243	0.2430	26.58	0.00122
470	0.0262	0.2620	27.16	0.00131
480	0.0264	0.2640	27.74	0.00132
490	0.0289	0.2890	28.31	0.00145
500	0.0302	0.3020	28.89	0.00151
510	0.0324	0.3240	29.47	0.00162
520	0.0326	0.3260	30.05	0.00163
530	0.0347	0.3470	30.63	0.00174
540	0.0412	0.4120	31.20	0.00206
550	0.0435	0.4350	31.78	0.00218
560	0.0465	0.4650	32.36	0.00233
570	0.0487	0.4870	32.94	0.00244

Analisa Modulus Elastisitas

RC-06-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0012	0.0120	0.58	0.00006
20	0.0014	0.0140	1.16	0.00007
30	0.0024	0.0240	1.73	0.00012
40	0.0026	0.0260	2.31	0.00013
50	0.0032	0.0320	2.89	0.00016
60	0.0034	0.0340	3.47	0.00017
70	0.0042	0.0420	4.04	0.00021
80	0.0046	0.0460	4.62	0.00023
90	0.0052	0.0520	5.20	0.00026
100	0.0057	0.0570	5.78	0.00029
110	0.0062	0.0620	6.36	0.00031
120	0.0066	0.0660	6.93	0.00033
130	0.0072	0.0720	7.51	0.00036
140	0.0074	0.0740	8.09	0.00037
150	0.0092	0.0920	8.67	0.00046
160	0.0090	0.0900	9.25	0.00045
170	0.0096	0.0960	9.82	0.00048
180	0.0099	0.0990	10.40	0.00050
190	0.0112	0.1120	10.98	0.00056
200	0.0114	0.1140	11.56	0.00057
210	0.0117	0.1170	12.13	0.00059
220	0.0132	0.1320	12.71	0.00066
230	0.0113	0.1134	13.29	0.00057
240	0.0136	0.1360	13.87	0.00068
250	0.0152	0.1520	14.45	0.00076
260	0.0154	0.1540	15.02	0.00077
270	0.0156	0.1560	15.60	0.00078
280	0.0172	0.1720	16.18	0.00086
290	0.0174	0.1740	16.76	0.00087
300	0.0192	0.1920	17.33	0.00096
310	0.0194	0.1940	17.91	0.00097
320	0.0196	0.1960	18.49	0.00098
330	0.0198	0.1980	19.07	0.00099
340	0.0202	0.2020	19.65	0.00101
350	0.0204	0.2040	20.22	0.00102
360	0.0206	0.2060	20.80	0.00103
370	0.0212	0.2120	21.38	0.00106
380	0.0224	0.2240	21.96	0.00112
390	0.0226	0.2260	22.54	0.00113
400	0.0228	0.2280	23.11	0.00114
410	0.0229	0.2290	23.69	0.00115
420	0.0234	0.2340	24.27	0.00117
430	0.0236	0.2360	24.85	0.00118
440	0.0245	0.2450	25.42	0.00123
450	0.0254	0.2540	26.00	0.00127
460	0.0256	0.2560	26.58	0.00128
470	0.0257	0.2570	27.16	0.00129
480	0.0262	0.2620	27.74	0.00131
490	0.0264	0.2640	28.31	0.00132
500	0.0266	0.2660	28.89	0.00133
510	0.0272	0.2720	29.47	0.00136
520	0.0274	0.2740	30.05	0.00137
530	0.0276	0.2760	30.63	0.00138
540	0.0322	0.3220	31.20	0.00161
550	0.0324	0.3240	31.78	0.00162
560	0.0326	0.3260	32.36	0.00163

Analisa Modulus Elastisitas

RC-O6-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0002	0.0020	0.58	0.00001
20	0.0012	0.0120	1.16	0.00006
30	0.0014	0.0140	1.73	0.00007
40	0.0016	0.0160	2.31	0.00008
50	0.0017	0.0170	2.89	0.00009
60	0.0022	0.0220	3.47	0.00011
70	0.0024	0.0240	4.04	0.00012
80	0.0026	0.0260	4.62	0.00013
90	0.0029	0.0290	5.20	0.00015
100	0.0032	0.0322	5.78	0.00016
110	0.0034	0.0340	6.36	0.00017
120	0.0036	0.0360	6.93	0.00018
130	0.0042	0.0420	7.51	0.00021
140	0.0044	0.0440	8.09	0.00022
150	0.0046	0.0460	8.67	0.00023
160	0.0048	0.0480	9.25	0.00024
170	0.0049	0.0490	9.82	0.00025
180	0.0052	0.0520	10.40	0.00026
190	0.0055	0.0550	10.98	0.00028
200	0.0062	0.0620	11.56	0.00031
210	0.0064	0.0640	12.13	0.00032
220	0.0066	0.0660	12.71	0.00033
230	0.0068	0.0680	13.29	0.00034
240	0.0072	0.0720	13.87	0.00036
250	0.0074	0.0740	14.45	0.00037
260	0.0082	0.0820	15.02	0.00041
270	0.0084	0.0840	15.60	0.00042
280	0.0086	0.0860	16.18	0.00043
290	0.0102	0.1020	16.76	0.00051
300	0.0104	0.1040	17.33	0.00052
310	0.0106	0.1060	17.91	0.00053
320	0.0122	0.1220	18.49	0.00061
330	0.0124	0.1240	19.07	0.00062
340	0.0126	0.1260	19.65	0.00063
350	0.0142	0.1420	20.22	0.00071
360	0.0144	0.1440	20.80	0.00072
370	0.0162	0.1620	21.38	0.00081
380	0.0164	0.1640	21.96	0.00082
390	0.0166	0.1660	22.54	0.00083
400	0.0182	0.1820	23.11	0.00091
410	0.0184	0.1840	23.69	0.00092
420	0.0202	0.2020	24.27	0.00101
430	0.0204	0.2040	24.85	0.00102
440	0.0224	0.2240	25.42	0.00112
450	0.0226	0.2260	26.00	0.00113
460	0.0243	0.2430	26.58	0.00122
470	0.0263	0.2630	27.16	0.00132
480	0.0265	0.2650	27.74	0.00133
490	0.0282	0.2820	28.31	0.00141
500	0.0302	0.3020	28.89	0.00151
510	0.0304	0.3040	29.47	0.00152
520	0.0322	0.3220	30.05	0.00161
530	0.0342	0.3420	30.63	0.00171
540	0.0412	0.4120	31.20	0.00206
550	0.0432	0.4320	31.78	0.00216
560	0.0463	0.4630	32.36	0.00232
570	0.0502	0.5020	32.94	0.00251

Analisa Modulus Elastisitas

RC-O7-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0025	0.0250	2.31	0.00013
50	0.0030	0.0300	2.89	0.00015
60	0.0045	0.0450	3.47	0.00023
70	0.0050	0.0500	4.04	0.00025
80	0.0055	0.0550	4.62	0.00028
90	0.0060	0.0600	5.20	0.00030
100	0.0075	0.0750	5.78	0.00038
110	0.0085	0.0850	6.36	0.00043
120	0.0094	0.0940	6.93	0.00047
130	0.0100	0.1000	7.51	0.00050
140	0.0105	0.1050	8.09	0.00053
150	0.0110	0.1100	8.67	0.00055
160	0.0114	0.1140	9.25	0.00057
170	0.0118	0.1180	9.82	0.00059
180	0.0125	0.1250	10.40	0.00063
190	0.0130	0.1300	10.98	0.00065
200	0.0135	0.1350	11.56	0.00068
210	0.0140	0.1400	12.13	0.00070
220	0.0147	0.1470	12.71	0.00074
230	0.0154	0.1540	13.29	0.00077
240	0.0158	0.1580	13.87	0.00079
250	0.0162	0.1620	14.45	0.00081
260	0.0167	0.1670	15.02	0.00084
270	0.0171	0.1710	15.60	0.00086
280	0.0180	0.1800	16.18	0.00090
290	0.0185	0.1850	16.76	0.00093
300	0.0190	0.1900	17.33	0.00095
310	0.0195	0.1950	17.91	0.00098
320	0.0200	0.2000	18.49	0.00100
330	0.0205	0.2050	19.07	0.00103
340	0.0208	0.2080	19.65	0.00104
350	0.0212	0.2120	20.22	0.00106
360	0.0216	0.2160	20.80	0.00108
370	0.0219	0.2190	21.38	0.00110
380	0.0226	0.2260	21.96	0.00113
390	0.0230	0.2300	22.54	0.00115
400	0.0235	0.2350	23.11	0.00118
410	0.0240	0.2400	23.69	0.00120
420	0.0245	0.2450	24.27	0.00123
430	0.0250	0.2500	24.85	0.00125
440	0.0255	0.2550	25.42	0.00128
450	0.0260	0.2600	26.00	0.00130
460	0.0270	0.2700	26.58	0.00135
470	0.0275	0.2750	27.16	0.00138
480	0.0280	0.2800	27.74	0.00140
490	0.0290	0.2900	28.31	0.00145
500	0.0295	0.2950	28.89	0.00148
510	0.0300	0.3000	29.47	0.00150
520	0.0305	0.3050	30.05	0.00153
530	0.0310	0.3100	30.63	0.00155
540	0.0315	0.3150	31.20	0.00158
550	0.0320	0.3200	31.78	0.00160
560	0.0325	0.3250	32.36	0.00163
570	0.0330	0.3300	32.94	0.00165
580	0.0335	0.3350	33.51	0.00168
590	0.0340	0.3400	34.09	0.00170
600	0.0345	0.3450	34.67	0.00173
610	0.0350	0.3500	35.25	0.00175
620	0.0355	0.3550	35.83	0.00178
630	0.0360	0.3600	36.40	0.00180
640	0.0365	0.3650	36.98	0.00183
645	0.0390	0.3900	37.27	0.00195

Analisa Modulus Elastisitas

RC-O7-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0025	0.0250	2.89	0.00013
60	0.0028	0.0280	3.47	0.00014
70	0.0030	0.0300	4.04	0.00015
80	0.0035	0.0350	4.62	0.00018
90	0.0040	0.0400	5.20	0.00020
100	0.0043	0.0430	5.78	0.00022
110	0.0045	0.0450	6.36	0.00023
120	0.0048	0.0480	6.93	0.00024
130	0.0050	0.0500	7.51	0.00025
140	0.0055	0.0550	8.09	0.00028
150	0.0060	0.0600	8.67	0.00030
160	0.0063	0.0630	9.25	0.00032
170	0.0066	0.0660	9.82	0.00033
180	0.0069	0.0690	10.40	0.00035
190	0.0072	0.0720	10.98	0.00036
200	0.0075	0.0750	11.56	0.00038
210	0.0080	0.0800	12.13	0.00040
220	0.0083	0.0830	12.71	0.00042
230	0.0086	0.0860	13.29	0.00043
240	0.0089	0.0890	13.87	0.00045
250	0.0092	0.0920	14.45	0.00046
260	0.0095	0.0950	15.02	0.00048
270	0.0098	0.0980	15.60	0.00049
280	0.0100	0.1000	16.18	0.00050
290	0.0105	0.1050	16.76	0.00053
300	0.0110	0.1100	17.33	0.00055
310	0.0115	0.1150	17.91	0.00058
320	0.0120	0.1200	18.49	0.00060
330	0.0123	0.1230	19.07	0.00062
340	0.0126	0.1260	19.65	0.00063
350	0.0129	0.1290	20.22	0.00065
360	0.0132	0.1320	20.80	0.00066
370	0.0134	0.1340	21.38	0.00067
380	0.0135	0.1350	21.96	0.00068
390	0.0137	0.1370	22.54	0.00069
400	0.0139	0.1390	23.11	0.00070
410	0.0141	0.1410	23.69	0.00071
420	0.0145	0.1450	24.27	0.00073
430	0.0150	0.1500	24.85	0.00075
440	0.0153	0.1530	25.42	0.00077
450	0.0157	0.1570	26.00	0.00079
460	0.0159	0.1590	26.58	0.00080
470	0.0163	0.1630	27.16	0.00082
480	0.0165	0.1650	27.74	0.00083
490	0.0175	0.1750	28.31	0.00088
500	0.0180	0.1800	28.89	0.00090
510	0.0185	0.1850	29.47	0.00093
520	0.0190	0.1900	30.05	0.00095
530	0.0195	0.1950	30.63	0.00098
540	0.0197	0.1970	31.20	0.00099
549	0.0210	0.2100	31.72	0.00105

Analisa Modulus Elastisitas

RC-O8-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0030	0.0300	2.89	0.00015
60	0.0040	0.0400	3.47	0.00020
70	0.0050	0.0500	4.04	0.00025
80	0.0055	0.0550	4.62	0.00028
90	0.0058	0.0580	5.20	0.00029
100	0.0060	0.0600	5.78	0.00030
110	0.0063	0.0630	6.36	0.00032
120	0.0065	0.0650	6.93	0.00033
130	0.0067	0.0670	7.51	0.00034
140	0.0069	0.0690	8.09	0.00035
150	0.0072	0.0720	8.67	0.00036
160	0.0075	0.0750	9.25	0.00038
170	0.0078	0.0780	9.82	0.00039
180	0.0080	0.0800	10.40	0.00040
190	0.0082	0.0820	10.98	0.00041
200	0.0087	0.0870	11.56	0.00044
210	0.0090	0.0900	12.13	0.00045
220	0.0093	0.0930	12.71	0.00047
230	0.0095	0.0950	13.29	0.00048
240	0.0097	0.0970	13.87	0.00049
250	0.0099	0.0990	14.45	0.00050
260	0.0102	0.1020	15.02	0.00051
270	0.0105	0.1050	15.60	0.00053
280	0.0108	0.1080	16.18	0.00054
290	0.0115	0.1150	16.76	0.00058
300	0.0120	0.1200	17.33	0.00060
310	0.0125	0.1250	17.91	0.00063
320	0.0130	0.1300	18.49	0.00065
330	0.0135	0.1350	19.07	0.00068
340	0.0140	0.1400	19.65	0.00070
350	0.0145	0.1450	20.22	0.00073
360	0.0150	0.1500	20.80	0.00075
370	0.0153	0.1530	21.38	0.00077
380	0.0156	0.1560	21.96	0.00078
390	0.0162	0.1620	22.54	0.00081
400	0.0165	0.1650	23.11	0.00083
410	0.0167	0.1670	23.69	0.00084
420	0.0173	0.1730	24.27	0.00087
430	0.0180	0.1800	24.85	0.00090
440	0.0185	0.1850	25.42	0.00093
450	0.0190	0.1900	26.00	0.00095
460	0.0195	0.1950	26.58	0.00098
470	0.0200	0.2000	27.16	0.00100
480	0.0210	0.2100	27.74	0.00105
490	0.0220	0.2200	28.31	0.00110
500	0.0225	0.2250	28.89	0.00113
510	0.0230	0.2300	29.47	0.00115
520	0.0240	0.2400	30.05	0.00120
530	0.0245	0.2450	30.63	0.00123
540	0.0250	0.2500	31.20	0.00125
550	0.0260	0.2600	31.78	0.00130
560	0.0265	0.2650	32.36	0.00133
570	0.0270	0.2700	32.94	0.00135
580	0.0275	0.2750	33.51	0.00138
586	0.0280	0.2800	33.86	0.00140

Analisa Modulus Elastisitas

RC-O8-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0020	0.0200	1.73	0.00010
40	0.0025	0.0250	2.31	0.00013
50	0.0030	0.0300	2.89	0.00015
60	0.0035	0.0350	3.47	0.00018
70	0.0040	0.0400	4.04	0.00020
80	0.0045	0.0450	4.62	0.00023
90	0.0050	0.0500	5.20	0.00025
100	0.0055	0.0550	5.78	0.00028
110	0.0060	0.0600	6.36	0.00030
120	0.0070	0.0700	6.93	0.00035
130	0.0080	0.0800	7.51	0.00040
140	0.0090	0.0900	8.09	0.00045
150	0.0100	0.1000	8.67	0.00050
160	0.0105	0.1050	9.25	0.00053
170	0.0110	0.1100	9.82	0.00055
180	0.0115	0.1150	10.40	0.00058
190	0.0120	0.1200	10.98	0.00060
200	0.0125	0.1250	11.56	0.00063
210	0.0130	0.1300	12.13	0.00065
220	0.0135	0.1350	12.71	0.00068
230	0.0140	0.1400	13.29	0.00070
240	0.0145	0.1450	13.87	0.00073
250	0.0150	0.1500	14.45	0.00075
260	0.0155	0.1550	15.02	0.00078
270	0.0160	0.1600	15.60	0.00080
280	0.0170	0.1700	16.18	0.00085
290	0.0180	0.1800	16.76	0.00090
300	0.0190	0.1900	17.33	0.00095
310	0.0200	0.2000	17.91	0.00100
320	0.0205	0.2050	18.49	0.00103
330	0.0210	0.2100	19.07	0.00105
340	0.0220	0.2200	19.65	0.00110
350	0.0225	0.2250	20.22	0.00113
360	0.0230	0.2300	20.80	0.00115
370	0.0235	0.2350	21.38	0.00118
380	0.0240	0.2400	21.96	0.00120
390	0.0245	0.2450	22.54	0.00123
400	0.0250	0.2500	23.11	0.00125
410	0.0255	0.2550	23.69	0.00128
420	0.0260	0.2600	24.27	0.00130
430	0.0265	0.2650	24.85	0.00133
440	0.0270	0.2700	25.42	0.00135
450	0.0275	0.2750	26.00	0.00138
460	0.0280	0.2800	26.58	0.00140
470	0.0285	0.2850	27.16	0.00143
481	0.0310	0.3100	27.79	0.00155

Analisa Modulus Elastisitas

RC-O9-1

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0025	0.0250	2.89	0.00013
60	0.0030	0.0300	3.47	0.00015
70	0.0040	0.0400	4.04	0.00020
80	0.0045	0.0450	4.62	0.00023
90	0.0050	0.0500	5.20	0.00025
100	0.0060	0.0600	5.78	0.00030
110	0.0065	0.0650	6.36	0.00033
120	0.0070	0.0700	6.93	0.00035
130	0.0075	0.0750	7.51	0.00038
140	0.0080	0.0800	8.09	0.00040
150	0.0090	0.0900	8.67	0.00045
160	0.0100	0.1000	9.25	0.00050
170	0.0105	0.1050	9.82	0.00053
180	0.0110	0.1100	10.40	0.00055
190	0.0115	0.1150	10.98	0.00058
200	0.0120	0.1200	11.56	0.00060
210	0.0130	0.1300	12.13	0.00065
220	0.0140	0.1400	12.71	0.00070
230	0.0145	0.1450	13.29	0.00073
240	0.0150	0.1500	13.87	0.00075
250	0.0155	0.1550	14.45	0.00078
260	0.0160	0.1600	15.02	0.00080
270	0.0165	0.1650	15.60	0.00083
280	0.0170	0.1700	16.18	0.00085
290	0.0175	0.1750	16.76	0.00088
300	0.0180	0.1800	17.33	0.00090
310	0.0200	0.2000	17.91	0.00100
320	0.0210	0.2100	18.49	0.00105
330	0.0215	0.2150	19.07	0.00108
340	0.0220	0.2200	19.65	0.00110
350	0.0225	0.2250	20.22	0.00113
360	0.0230	0.2300	20.80	0.00115
370	0.0235	0.2350	21.38	0.00118
380	0.0240	0.2400	21.96	0.00120
390	0.0245	0.2450	22.54	0.00123
400	0.0250	0.2500	23.11	0.00125
410	0.0255	0.2550	23.69	0.00128
420	0.0260	0.2600	24.27	0.00130
430	0.0270	0.2700	24.85	0.00135
440	0.0280	0.2800	25.42	0.00140
450	0.0285	0.2850	26.00	0.00143
460	0.0290	0.2900	26.58	0.00145
470	0.0300	0.3000	27.16	0.00150
480	0.0305	0.3050	27.74	0.00153
490	0.0310	0.3100	28.31	0.00155
500	0.0315	0.3150	28.89	0.00158
510	0.0320	0.3200	29.47	0.00160
520	0.0330	0.3300	30.05	0.00165
530	0.0335	0.3350	30.63	0.00168
540	0.0340	0.3400	31.20	0.00170
550	0.0350	0.3500	31.78	0.00175
560	0.0355	0.3550	32.36	0.00178
563	0.0380	0.3800	32.53	0.00190

Analisa Modulus Elastisitas

RC-O9-2

P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0008	0.0080	1.16	0.00004
30	0.0010	0.0100	1.73	0.00005
40	0.0014	0.0140	2.31	0.00007
50	0.0018	0.0180	2.89	0.00009
60	0.0021	0.0210	3.47	0.00011
70	0.0023	0.0230	4.04	0.00012
80	0.0025	0.0250	4.62	0.00013
90	0.0028	0.0280	5.20	0.00014
100	0.0031	0.0310	5.78	0.00016
110	0.0034	0.0340	6.36	0.00017
120	0.0037	0.0370	6.93	0.00019
130	0.0039	0.0390	7.51	0.00020
140	0.0042	0.0420	8.09	0.00021
150	0.0045	0.0450	8.67	0.00023
160	0.0047	0.0470	9.25	0.00024
170	0.0049	0.0490	9.82	0.00025
180	0.0052	0.0520	10.40	0.00026
190	0.0055	0.0550	10.98	0.00028
200	0.0057	0.0570	11.56	0.00029
210	0.0059	0.0590	12.13	0.00030
220	0.0062	0.0620	12.71	0.00031
230	0.0065	0.0650	13.29	0.00033
240	0.0067	0.0670	13.87	0.00034
250	0.0069	0.0690	14.45	0.00035
260	0.0072	0.0720	15.02	0.00036
270	0.0075	0.0750	15.60	0.00038
280	0.0077	0.0770	16.18	0.00039
290	0.0080	0.0800	16.76	0.00040
300	0.0085	0.0850	17.33	0.00043
310	0.0090	0.0900	17.91	0.00045
320	0.0095	0.0950	18.49	0.00048
330	0.0100	0.1000	19.07	0.00050
340	0.0105	0.1050	19.65	0.00053
350	0.0110	0.1100	20.22	0.00055
360	0.0115	0.1150	20.80	0.00058
370	0.0120	0.1200	21.38	0.00060
380	0.0123	0.1230	21.96	0.00062
390	0.0126	0.1260	22.54	0.00063
400	0.0129	0.1290	23.11	0.00065
410	0.0132	0.1320	23.69	0.00066
420	0.0135	0.1350	24.27	0.00068
430	0.0137	0.1370	24.85	0.00069
440	0.0139	0.1390	25.42	0.00070
450	0.0142	0.1420	26.00	0.00071
460	0.0144	0.1440	26.58	0.00072
470	0.0146	0.1460	27.16	0.00073
480	0.0148	0.1480	27.74	0.00074
490	0.0150	0.1500	28.31	0.00075
500	0.0153	0.1530	28.89	0.00077
510	0.0158	0.1580	29.47	0.00079
520	0.0162	0.1620	30.05	0.00081
530	0.0170	0.1700	30.63	0.00085
540	0.0180	0.1800	31.20	0.00090
545	0.0190	0.1900	31.49	0.00095

Analisa Modulus Elastisitas

RC-O10-1

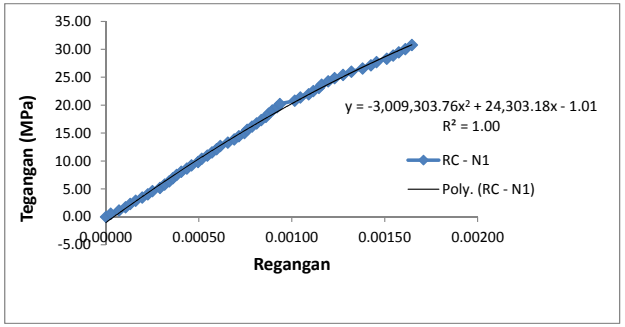
P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0030	0.0300	2.89	0.00015
60	0.0035	0.0350	3.47	0.00018
70	0.0040	0.0400	4.04	0.00020
80	0.0045	0.0450	4.62	0.00023
90	0.0050	0.0500	5.20	0.00025
100	0.0055	0.0550	5.78	0.00028
110	0.0060	0.0600	6.36	0.00030
120	0.0065	0.0650	6.93	0.00033
130	0.0070	0.0700	7.51	0.00035
140	0.0075	0.0750	8.09	0.00038
150	0.0080	0.0800	8.67	0.00040
160	0.0090	0.0900	9.25	0.00045
170	0.0100	0.1000	9.82	0.00050
180	0.0110	0.1100	10.40	0.00055
190	0.0120	0.1200	10.98	0.00060
200	0.0130	0.1300	11.56	0.00065
210	0.0140	0.1400	12.13	0.00070
220	0.0150	0.1500	12.71	0.00075
230	0.0160	0.1600	13.29	0.00080
240	0.0170	0.1700	13.87	0.00085
250	0.0175	0.1750	14.45	0.00088
260	0.0180	0.1800	15.02	0.00090
270	0.0185	0.1850	15.60	0.00093
280	0.0190	0.1900	16.18	0.00095
290	0.0195	0.1950	16.76	0.00098
300	0.0200	0.2000	17.33	0.00100
310	0.0205	0.2050	17.91	0.00103
320	0.0210	0.2100	18.49	0.00105
330	0.0215	0.2150	19.07	0.00108
340	0.0220	0.2200	19.65	0.00110
350	0.0225	0.2250	20.22	0.00113
360	0.0230	0.2300	20.80	0.00115
370	0.0235	0.2350	21.38	0.00118
380	0.0240	0.2400	21.96	0.00120
390	0.0245	0.2450	22.54	0.00123
400	0.0250	0.2500	23.11	0.00125
410	0.0255	0.2550	23.69	0.00128
420	0.0260	0.2600	24.27	0.00130
430	0.0265	0.2650	24.85	0.00133
440	0.0270	0.2700	25.42	0.00135
450	0.0275	0.2750	26.00	0.00138
460	0.0280	0.2800	26.58	0.00140
470	0.0285	0.2850	27.16	0.00143
480	0.0290	0.2900	27.74	0.00145
490	0.0295	0.2950	28.31	0.00148
500	0.0300	0.3000	28.89	0.00150
510	0.0305	0.3050	29.47	0.00153
520	0.0310	0.3100	30.05	0.00155
530	0.0315	0.3150	30.63	0.00158
540	0.0320	0.3200	31.20	0.00160
550	0.0325	0.3250	31.78	0.00163
560	0.0330	0.3300	32.36	0.00165
571	0.0335	0.3350	32.99	0.00168

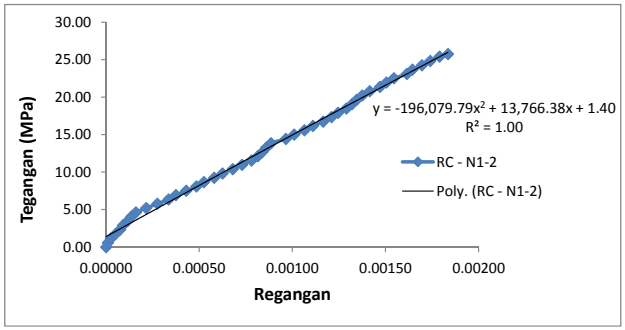
Analisa Modulus Elastisitas

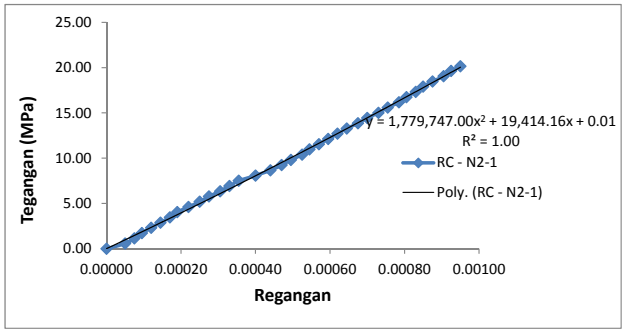
RC-O10-2

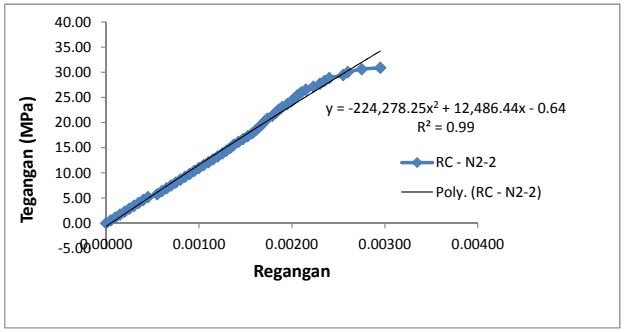
P (KN)	Perpendekan (x 1/10 mm)	Perpendekan (mm)	Tegangan (MPa)	Regangan (mm)
0	0.0000	0.0000	0.00	0.00000
10	0.0005	0.0050	0.58	0.00003
20	0.0010	0.0100	1.16	0.00005
30	0.0015	0.0150	1.73	0.00008
40	0.0020	0.0200	2.31	0.00010
50	0.0030	0.0300	2.89	0.00015
60	0.0035	0.0350	3.47	0.00018
70	0.0040	0.0400	4.04	0.00020
80	0.0045	0.0450	4.62	0.00023
90	0.0050	0.0500	5.20	0.00025
100	0.0055	0.0550	5.78	0.00028
110	0.0060	0.0600	6.36	0.00030
120	0.0065	0.0650	6.93	0.00033
130	0.0070	0.0700	7.51	0.00035
140	0.0075	0.0750	8.09	0.00038
150	0.0080	0.0800	8.67	0.00040
160	0.0090	0.0900	9.25	0.00045
170	0.0100	0.1000	9.82	0.00050
180	0.0110	0.1100	10.40	0.00055
190	0.0120	0.1200	10.98	0.00060
200	0.0130	0.1300	11.56	0.00065
210	0.0140	0.1400	12.13	0.00070
220	0.0150	0.1500	12.71	0.00075
230	0.0160	0.1600	13.29	0.00080
240	0.0170	0.1700	13.87	0.00085
250	0.0175	0.1750	14.45	0.00088
260	0.0180	0.1800	15.02	0.00090
270	0.0185	0.1850	15.60	0.00093
280	0.0190	0.1900	16.18	0.00095
290	0.0195	0.1950	16.76	0.00098
300	0.0200	0.2000	17.33	0.00100
310	0.0205	0.2050	17.91	0.00103
320	0.0210	0.2100	18.49	0.00105
330	0.0215	0.2150	19.07	0.00108
340	0.0220	0.2200	19.65	0.00110
350	0.0225	0.2250	20.22	0.00113
360	0.0230	0.2300	20.80	0.00115
370	0.0235	0.2350	21.38	0.00118
380	0.0240	0.2400	21.96	0.00120
390	0.0245	0.2450	22.54	0.00123
400	0.0250	0.2500	23.11	0.00125
410	0.0260	0.2600	23.69	0.00130
420	0.0265	0.2650	24.27	0.00133
430	0.0270	0.2700	24.85	0.00135
440	0.0275	0.2750	25.42	0.00138
450	0.0280	0.2800	26.00	0.00140
460	0.0285	0.2850	26.58	0.00143
470	0.0290	0.2900	27.16	0.00145
480	0.0295	0.2950	27.74	0.00148
490	0.0300	0.3000	28.31	0.00150
500	0.0305	0.3050	28.89	0.00153
510	0.0310	0.3100	29.47	0.00155
520	0.0315	0.3150	30.05	0.00158
530	0.0320	0.3200	30.63	0.00160
540	0.0325	0.3250	31.20	0.00163
550	0.0330	0.3300	31.78	0.00165
560	0.0335	0.3350	32.36	0.00168
570	0.0340	0.3400	32.94	0.00170
580	0.0345	0.3450	33.51	0.00173
590	0.0350	0.3500	34.09	0.00175
600	0.0355	0.3550	34.67	0.00178
610	0.0360	0.3600	35.25	0.00180
621	0.0390	0.3900	35.88	0.00195

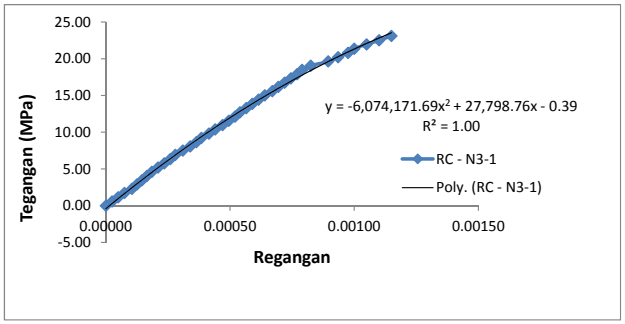
Grafik Tegangan Regangan Beton Normal

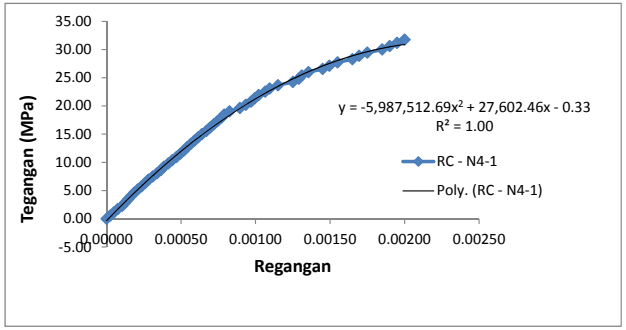


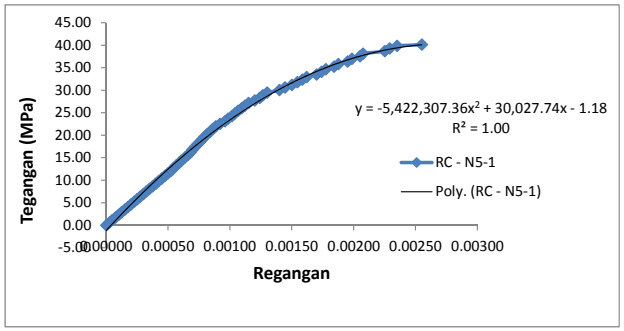


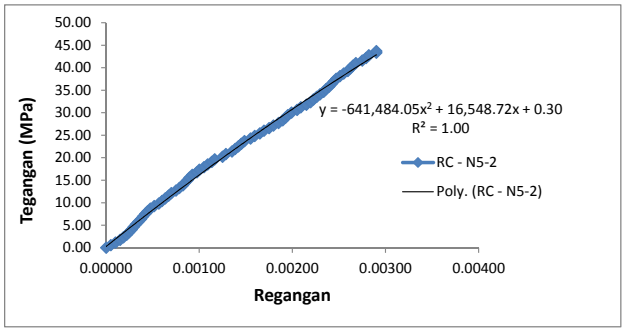


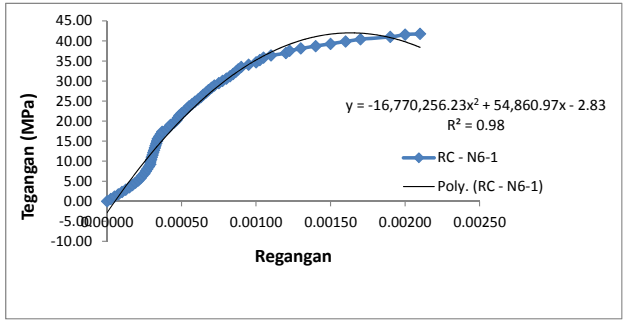




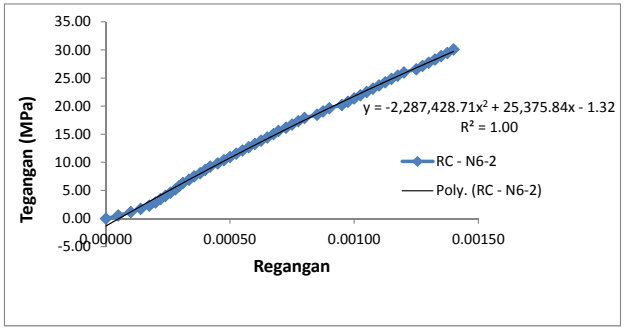


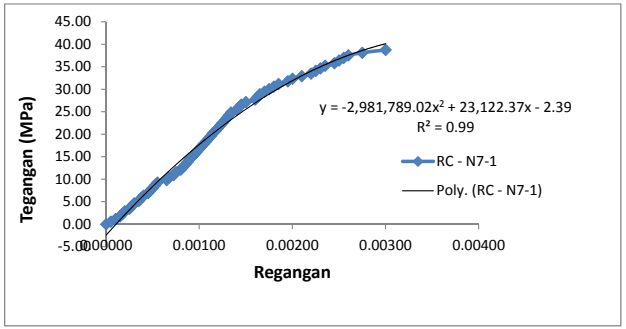


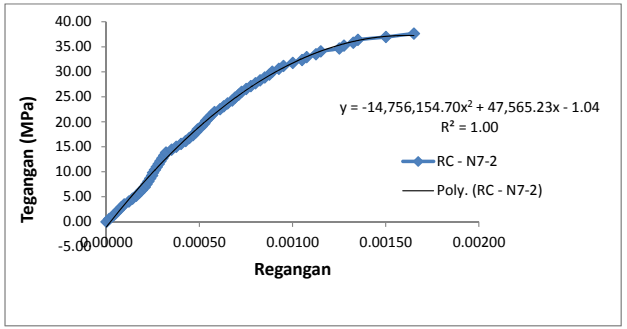


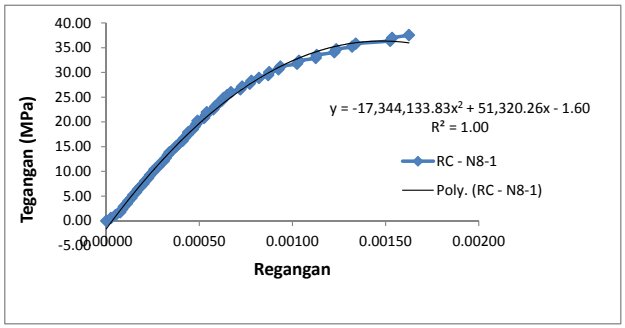


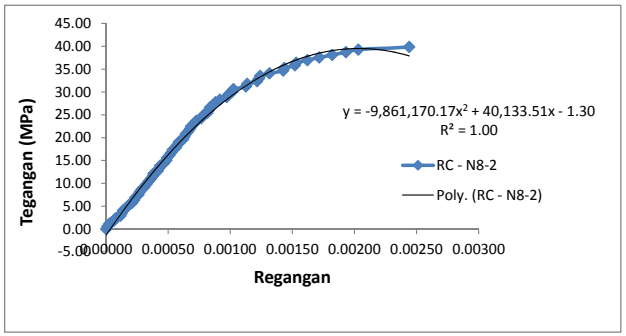
Grafik Tegangan Regangan Beton Normal

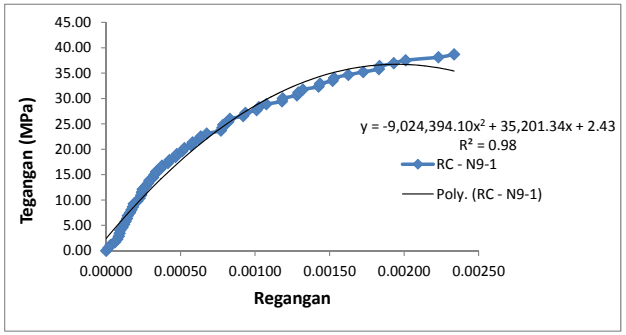


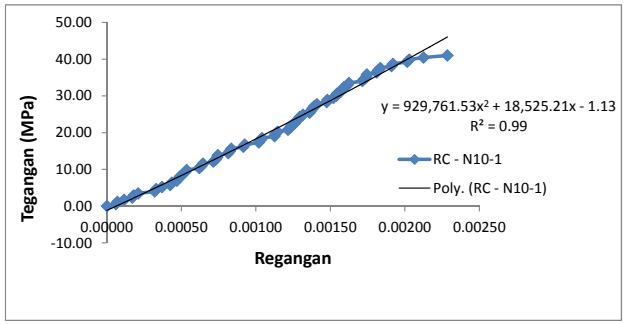


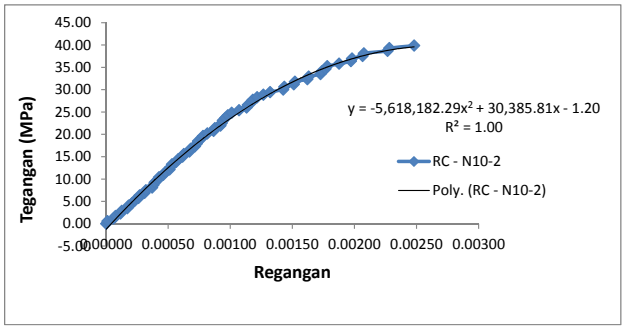




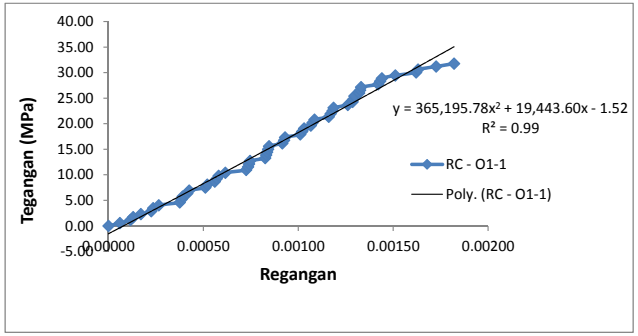


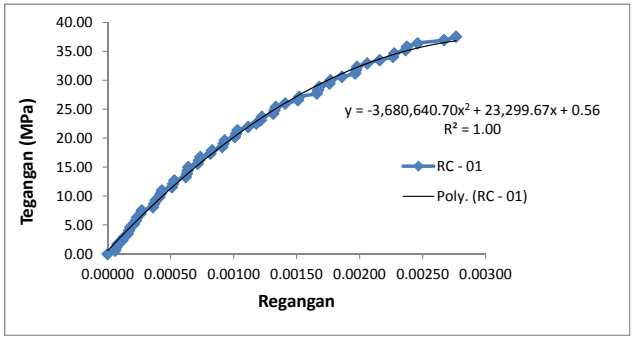


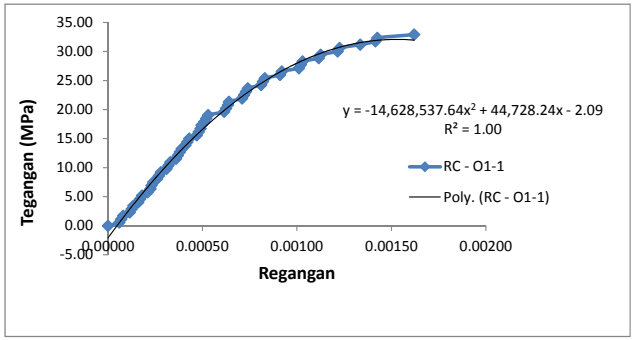


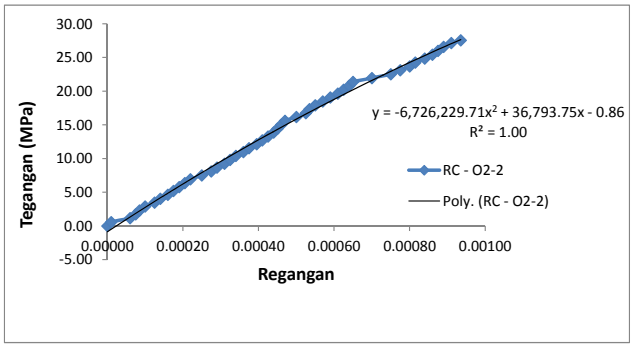


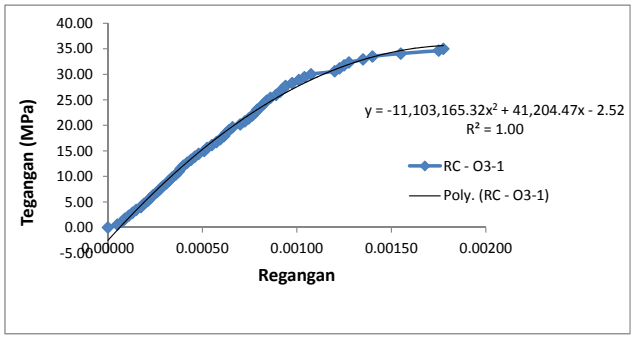
Grafik Tegangan Regangan Beton Limbah Onyx

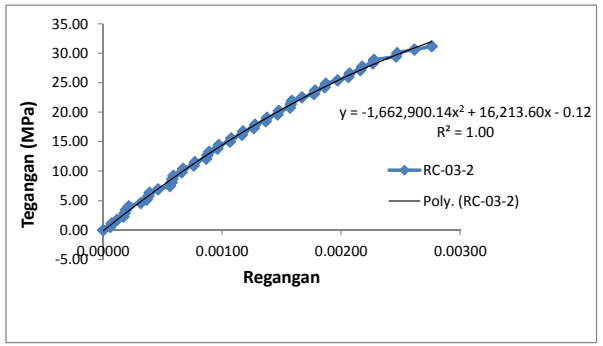


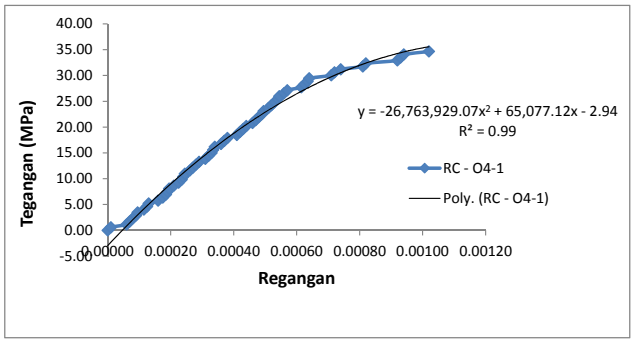


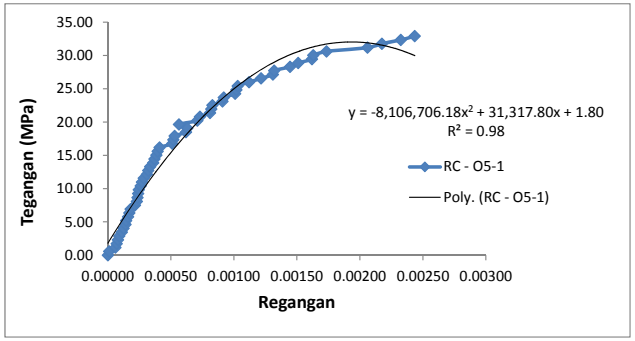


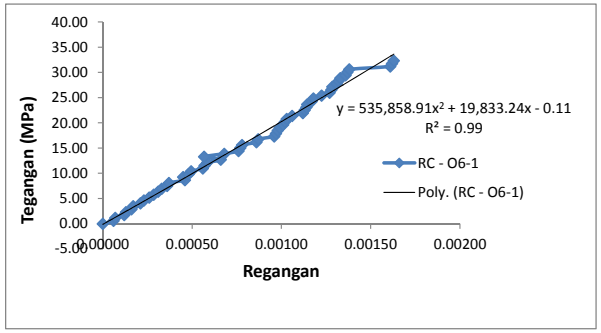




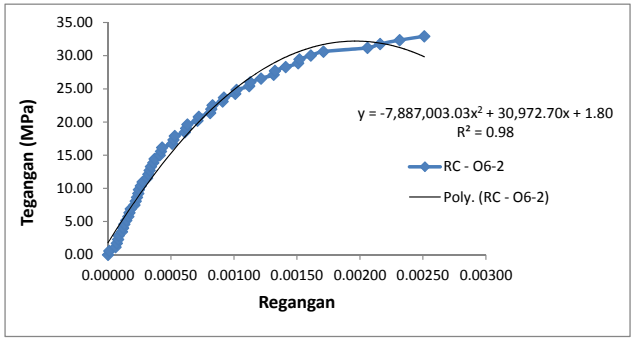


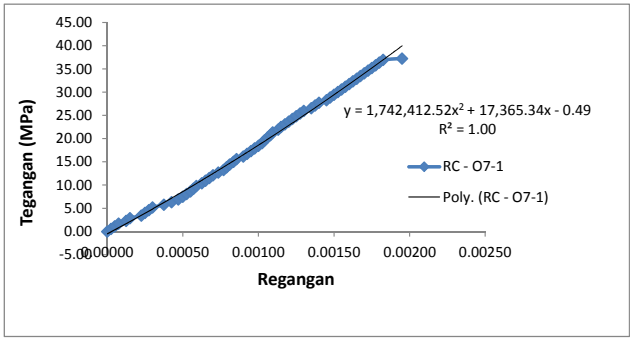


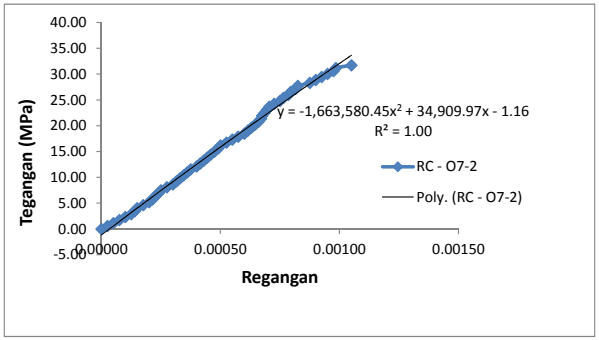


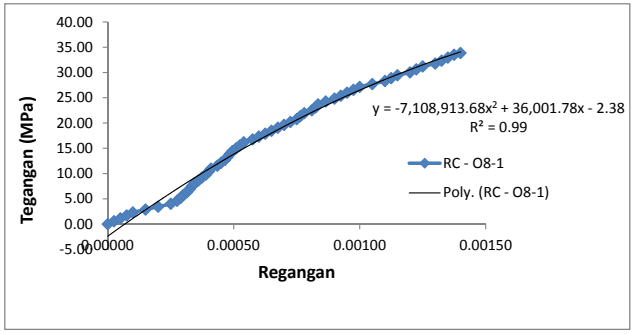


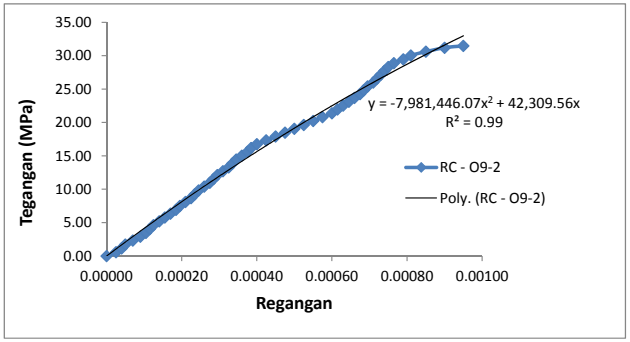
Grafik Tegangan Regangan Beton Limbah Onyx

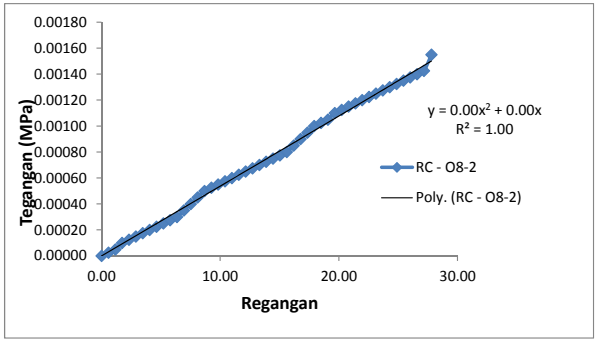


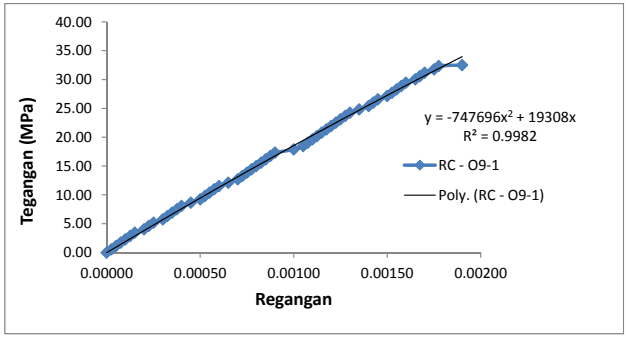


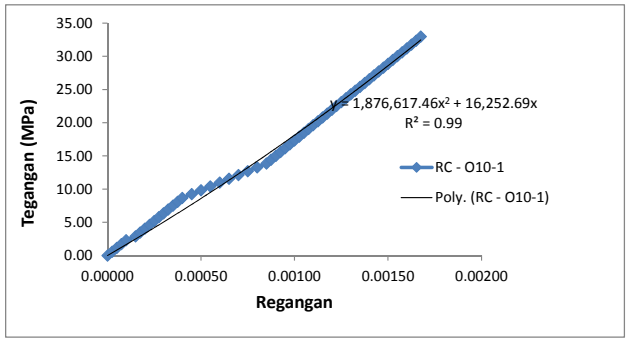


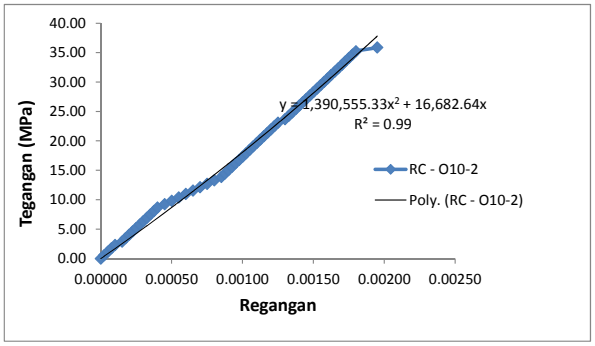












MODULUS ELASTISITAS BETON NORMAL

NAMA BENDA UJI	Kuat Tekan (F'c)	Ax2	Bx	c	c	D	X1	X2	E2	S2	E1	S1	EC
RC-N1-1	30.80	-3,009,303.76	24,303.18	-1.01	-13.32939769	430195731.7	0.000592	0.007484	0.000592	12.3193977	0.00005	0.19764	22,371.70
RC-N1-2	25.77	-196,079.79	13,766.38	1.4	-8.908539158	182526080.4	0.000653	0.069555	0.000653	10.3085392	0.00005	2.08783	13,628.50
RC-N2-2	30.91	1,779,747.00	19,414.16	0.01	-12.35562433	464869149.8	0.000603	-0.011511	0.000603	12.3656243	0.00005	0.98516	20,576.48
RC-N3-1	23.11	-6,074,171.69	27,798.76	-0.39	-9.635326599	538664545.3	0.000378	0.004199	0.000378	9.2453266	0.00005	0.98475	25,200.25
RC-N4-1	31.78	-5,987,512.69	27,602.46	-0.33	-13.04232407	449531474.4	0.000534	0.004076	0.000534	12.7123241	0.00005	1.03515	24,102.93
RC-N5-1	40.16	-5,422,307.36	30,027.74	-1.18	-17.24375497	527661411.6	0.000651	0.004887	0.000651	16.063755	0.00005	0.30783	26,228.20
RC-N5-2	43.68	-641,484.05	16,548.72	0.3	-17.17366727	229793599.1	0.001083	0.024714	0.001083	17.4736673	0.00005	1.12583	15,821.76
RC-N6-1	41.78	-16,770,256.23	54,860.97	-2.83	-19.54092783	1698900563	0.000407	0.002865	0.000407	16.7109278	0.00005	-0.12888	47,200.83
RC-N6-2	30.11	-2,287,428.71	25,375.84	-1.32	-13.3620379	521674419.3	0.000554	0.010539	0.000554	12.0420379	0.00005	-0.05693	23,993.65
RC-N7-1	38.77	-2,981,789.02	23,122.37	-2.39	-17.89903537	321159405.9	0.000872	0.006882	0.000872	15.5090354	0.00005	-1.24134	20,372.56
RC-N7-2	37.67	-14,756,154.70	47,565.23	-1.04	-16.10988236	1311571440	0.000385	0.002839	0.000385	15.0698824	0.00005	1.30137	41,152.62
RC-N8-1	37.56	-17,344,133.83	51,320.26	-1.6	-16.62365572	1480477448	0.000370	0.002589	0.000370	15.0236557	0.00005	0.92265	44,031.41
RC-N8-2	39.87	-9,861,170.17	40,133.51	-1.3	-17.24818838	930349341.8	0.000488	0.003581	0.000488	15.9481884	0.00005	0.68202	34,824.51
RC-N9-1	38.71	-9,024,394.10	35,201.34	2.43	-13.05592205	767847194	0.000415	0.003486	0.000415	15.4859221	0.00005	4.16751	31,004.48
RC-N10-1	41.03	929,761.53	18,525.21	-1.13	-17.54045471	408417165.6	0.000906	-0.020830	0.000906	16.4104547	0.00005	-0.20142	19,413.76
RC-N10-2	39.87	-5,618,182.29	30,385.81	-1.2	-17.14818838	537930856.2	0.000640	0.004768	0.000640	15.9481884	0.00005	0.30525	26,508.66
RATA - RATA													27,277.02

MODULUS ELASTISITAS BETON LIMBAH ONYX

NAMA BENDA UJI	Kuat Tekan (F'c)	Ax2	Bx	c	c	D	X1	X2	E2	S2	E1	S1	EC
RC-O1-1	31.78	365,195.78	19,443.60	-1.52	-14.23232407	398843919.7	0.000722	-0.053964	0.000722	12.71232407	0.00005	-0.547	19,725.60
RC-O1-2	37.56	-3,680,640.70	23,299.67	0.56	-14.46365572	329932542.4	0.000698	0.005633	0.000698	15.02365572	0.00005	1.716	20,547.83
RC-O2-1	32.94	-14,628,537.64	44,728.24	-2.09	-15.2645904	1107420912	0.000391	0.002666	0.000391	13.1745904	0.00005	0.110	35,432.98
RC-O2-2	27.56	-6,726,229.71	36,793.75	-0.86	-11.88505197	1034013680	0.000345	0.005125	0.000345	11.02505197	0.00005	0.963	34,138.61
RC-O3-1	35.02	-11,103,165.32	41,204.47	-2.52	-16.5266698	963814960.2	0.000457	0.003254	0.000457	14.0066698	0.00005	-0.488	32,133.21
RC-O3-2	31.20	-1,662,900.14	16,213.60	-0.12	-12.60119091	179062736.5	0.000852	0.008899	0.000852	12.48119091	0.00005	0.687	14,714.37
RC-O4-1	34.67	-6,763,929.07	35,077.12	-2.94	-16.8079899	775652141.6	0.000534	0.004652	0.000534	13.8679899	0.00005	-1.203	31,125.63
RC-O5-1	32.94	-8,106,706.18	31,317.80	1.8	-11.3745904	611962747.5	0.000406	0.003457	0.000406	13.1745904	0.00005	3.346	27,622.51
RC-O6-1	32.36	535,858.91	19,833.24	-0.11	-13.05345724	421336654.4	0.000647	-0.037659	0.000647	12.94345724	0.00005	0.883	20,206.66
RC-O6-2	32.94	-7,887,003.03	30,972.70	1.8	-11.3745904	600462429.4	0.000410	0.003517	0.000410	13.1745904	0.00005	3.329	27,344.17
RC-O7-1	37.27	1,742,412.52	17,365.34	-0.49	-15.39808914	408874326.5	0.000819	-0.010786	0.000819	14.90808914	0.00005	0.383	18,880.11
RC-O7-2	31.72	-1,663,580.45	34,909.97	-1.16	-13.84921076	1126548900	0.000405	0.020580	0.000405	12.68921076	0.00005	0.581	33,123.43
RC-O8-1	33.86	-7,108,913.68	36,001.78	-2.38	-15.92440347	843307324.5	0.000490	0.004575	0.000490	13.54440347	0.00005	-0.598	32,165.32
RC-O8-2	27.79	-7,981,446.07	42,309.56	0	-11.11750524	1435163794	0.000277	0.005024	0.000277	11.11750524	0.00005	2.096	39,697.49
RC-O9-1	32.53	-747,696.00	19,308.00	0	-13.01279719	333880398.4	0.000693	0.025131	0.000693	13.01279719	0.00005	0.964	18,752.81
RC-O9-2	31.49	-7,981,446.07	42,309.56	0	-12.59675749	1387937505	0.000317	0.004984	0.000317	12.59675749	0.00005	2.096	35,373.42
RC-O10-1	32.99	1,876,617.46	16,252.69	0	-13.19770372	363218097.2	0.000748	-0.009408	0.000748	13.19770372	0.00005	0.817	17,749.32
RC-O10-2	35.88	1,390,555.33	16,682.64	0	-14.35336955	358147095.5	0.000806	-0.012803	0.000806	14.35336955	0.00005	0.838	17,873.24
RATA - RATA													26,478.15

LAMPIRAN 6

ANALISA BLOK TEGANGAN TEKAN EKUIVALEN (β1)

Rangkuman Nilai Analisa β1 Beton Normal

NAMA	TEGANGAN	TEGANGAN X 0.9	ε0	εcu	Ec real	B1	B1 SNI
RC-N1-1	30.80	27.72	0.00215	0.0030	27277.0181	0.912	0.850
RC-N1-2	25.77	23.19	0.00215	0.0030	27277.0181	0.943	0.850
RC-N2-1	30.91	27.82	0.00215	0.0030	27277.0181	0.912	0.850
RC-N3-1	23.11	20.80	0.00215	0.0030	27277.0181	0.960	0.850
RC-N4-1	31.78	28.60	0.00215	0.0030	27277.0181	0.906	0.850
RC-N5-1	40.16	36.14	0.00215	0.0028	27277.0181	0.845	0.800
RC-N5-2	43.68	39.32	0.00215	0.0027	27277.0181	0.817	0.800
RC-N6-1	41.78	37.60	0.00215	0.0027	27277.0181	0.796	0.800
RC-N6-2	30.11	27.09	0.00215	0.0030	27277.0181	0.916	0.850
RC-N7-1	38.77	34.90	0.00215	0.0029	27277.0181	0.856	0.800
RC-N7-2	37.67	33.91	0.00215	0.0029	27277.0181	0.856	0.800
RC-N8-1	37.56	33.80	0.00215	0.0030	27277.0181	0.868	0.800
RC-N8-2	39.87	35.88	0.00215	0.0028	27277.0181	0.847	0.800
RC-N9-1	38.71	34.84	0.00215	0.0029	27277.0181	0.856	0.800
RC-N10-1	41.03	36.92	0.00215	0.0028	27277.0181	0.840	0.800
RC-N10-2	39.87	35.88	0.00215	0.0028	27277.0181	0.847	0.800
Rata - Rata	35.72	32.15		0.0029		0.874	0.819

Rangkuman Nilai Analisa β1 Beton Limbah Onyx

NAMA	TEGANGAN	TEGANGAN X 0.9	ε0	εcu	Ec real	B1	B1 SNI
RC-O1-1	31.78	28.60	0.00186	0.0025	26478.1489	0.846	0.850
RC-O1-2	37.56	33.80	0.00186	0.0024	26478.1489	0.820	0.800
RC-O2-1	32.94	29.64	0.00186	0.0026	26478.1489	0.867	0.850
RC-O2-2	27.56	24.81	0.00186	0.0028	26478.1489	0.914	0.850
RC-O3-1	35.02	31.52	0.00186	0.0028	26478.1489	0.853	0.800
RC-O3-2	31.20	28.08	0.00186	0.0027	26478.1489	0.884	0.850
RC-O4-1	34.67	31.20	0.00186	0.0025	26478.1489	0.848	0.850
RC-O5-1	32.94	29.64	0.00186	0.0028	26478.1489	0.872	0.850
RC-O6-1	32.36	29.12	0.00186	0.0027	26478.1489	0.873	0.850
RC-O6-2	32.94	29.64	0.00186	0.0026	26478.1489	0.873	0.850
RC-O7-1	37.27	33.54	0.00186	0.0024	26478.1489	0.867	0.800
RC-O7-2	31.72	28.55	0.00186	0.0027	26478.1489	0.878	0.850
RC-O8-1	33.86	30.47	0.00186	0.0026	26478.1489	0.857	0.850
RC-O8-2	27.79	25.01	0.00186	0.0030	26478.1489	0.922	0.850
RC-O9-1	32.53	29.28	0.00186	0.0026	26478.1489	0.870	0.850
RC-O9-2	31.49	28.34	0.00186	0.0027	26478.1489	0.882	0.850
RC-O10-1	32.99	29.69	0.00186	0.0026	26478.1489	0.866	0.850
RC-O10-2	35.88	32.30	0.00186	0.0025	26478.1489	0.836	0.800
Rata - Rata	32.92	29.45		0.0026		0.868	0.839

RC-N1-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	394.32	2.7
0.00015	589.24	4.1
0.00020	781.65	5.4
0.00025	970.85	6.7
0.00030	1156.22	8.0
0.00035	1337.18	9.2
0.00040	1513.22	10.4
0.00045	1683.90	11.6
0.00050	1848.83	12.7
0.00055	2007.68	13.8
0.00060	2160.19	14.9
0.00065	2306.14	15.9
0.00070	2445.40	16.9
0.00075	2577.86	17.8
0.00080	2703.47	18.6
0.00085	2822.23	19.5
0.00090	2934.17	20.2
0.00095	3039.36	21.0
0.00100	3137.91	21.6
0.00105	3229.95	22.3
0.00110	3315.63	22.9
0.00115	3395.14	23.4
0.00120	3468.66	23.9
0.00125	3536.41	24.4
0.00130	3598.60	24.8
0.00135	3655.44	25.2
0.00140	3707.18	25.6
0.00145	3754.04	25.9
0.00150	3796.25	26.2
0.00155	3834.04	26.4
0.00160	3867.65	26.7
0.00165	3897.28	26.9
0.00170	3923.17	27.0
0.00175	3945.52	27.2
0.00180	3964.55	27.3
0.00185	3980.44	27.4
0.00190	3993.39	27.5
0.00195	4003.59	27.6
0.00200	4011.21	27.7
0.00205	4016.43	27.7
0.00210	4019.39	27.7
0.00215	4020.25	27.7
0.00220	4007.38	27.6
0.00225	3993.29	27.5
0.00230	3977.39	27.4
0.00235	3959.85	27.3
0.00240	3940.81	27.2
0.00245	3920.41	27.0
0.00250	3898.79	26.9
0.00255	3876.06	26.7
0.00260	3852.34	26.6
0.00265	3827.73	26.4
0.00270	3802.34	26.2
0.00275	3776.26	26.0
0.00280	3749.56	25.9
0.00285	3722.34	25.7
0.00290	3694.67	25.5
0.00295	3666.60	25.3
0.00300	3638.21	25.1

$0.9 \times fc' = 27.7$ MPa = 4020.256806 psi

$Ec = 27277.02$ MPa = 3956204.149 psi

$Ec' = fc'/eo$

$= 12913.03878$ MPa = 1872881.319 psi

$\varepsilon 0 = 0.00215$

$\varepsilon cu = 0.00300$

$n = \frac{Ec}{(Ec-Ec')}$ 40

$n = 1.898987565$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4020.256806}{9000}$ untuk ec/eo >1

$k2 = 1.116695201$

$nk1 = 1.898987565$

$nk2 = 2.1205903$

Luas Kurva = $\int y$

Misal $y = fc$

$x = \varepsilon c$

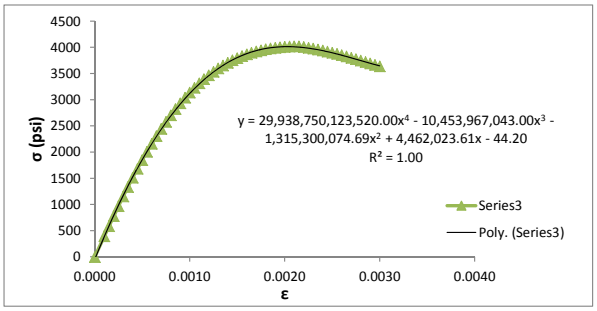
$y = 29{,}938{,}750{,}123{,}520\,x^4 + -10{,}453{,}967{,}043\,x^3 + -1{,}315{,}300{,}074.69\,x^2 + 4{,}462{,}023.61\,x + -44$

$\int y = 5{,}987{,}750{,}024{,}704\,x^5 + -2{,}613{,}491{,}761\,x^4 + -438{,}433{,}358\,x^3 + 2{,}231{,}012\,x^2 + -44\,x$

$A = 1.46 + -0.21 + -11.84 + 20.08 + -0.13$

$A = 9.35$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.912$



RC-N1-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	391.90	2.7
0.00015	582.60	4.0
0.00020	768.24	5.3
0.00025	947.98	6.5
0.00030	1121.17	7.7
0.00035	1287.31	8.9
0.00040	1446.04	10.0
0.00045	1597.14	11.0
0.00050	1740.47	12.0
0.00055	1875.99	12.9
0.00060	2003.73	13.8
0.00065	2123.78	14.6
0.00070	2236.31	15.4
0.00075	2341.50	16.1
0.00080	2439.57	16.8
0.00085	2530.79	17.4
0.00090	2615.42	18.0
0.00095	2693.74	18.6
0.00100	2766.06	19.1
0.00105	2832.65	19.5
0.00110	2893.82	20.0
0.00115	2949.87	20.3
0.00120	3001.07	20.7
0.00125	3047.70	21.0
0.00130	3090.04	21.3
0.00135	3128.36	21.6
0.00140	3162.89	21.8
0.00145	3193.88	22.0
0.00150	3221.55	22.2
0.00155	3246.14	22.4
0.00160	3267.83	22.5
0.00165	3286.83	22.7
0.00170	3303.31	22.8
0.00175	3317.46	22.9
0.00180	3329.43	23.0
0.00185	3339.38	23.0
0.00190	3347.45	23.1
0.00195	3353.78	23.1
0.00200	3358.49	23.2
0.00205	3361.69	23.2
0.00210	3363.51	23.2
0.00215	3364.04	23.2
0.00220	3359.70	23.2
0.00225	3354.48	23.1
0.00230	3348.23	23.1
0.00235	3341.04	23.0
0.00240	3333.00	23.0
0.00245	3324.16	22.9
0.00250	3314.61	22.9
0.00255	3304.40	22.8
0.00260	3293.59	22.7
0.00265	3282.24	22.6
0.00270	3270.40	22.5
0.00275	3258.12	22.5
0.00280	3245.43	22.4
0.00285	3232.39	22.3
0.00290	3219.02	22.2
0.00295	3205.37	22.1
0.00300	3191.46	22.0

0.9 x fc' = 23.2 MPa = 3364.04228 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 10805.28198 MPa = 1567176.488 psi

ε0 = 0.00215

εcu = 0.00300

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 1.65598926

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{3364.04228}{9000}$$ untuk ec/eo >1

k2 = 1.043782476

nk1 = 1.65598926

nk2 = 1.72849257

Luas Kurva = ∫y

Misal y = fc

x = εc

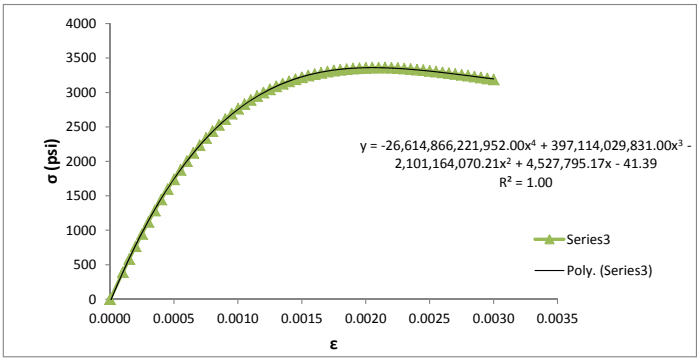
y = -26,614,866,221,952 x^4 + 397,114,029,831.00 x^3 + -2,101,164,070.21 x^2 + 4,527,795.17 x + -41

∫y = -5,322,973,244,390 x^5 + 99,278,507,458 x^4 + -700,388,023 x^3 + 2,263,898 x^2 + -41 x

A = -1.29 + 8.04 + -18.91 + 20.38 + -0.12

A = 8.09

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.943$$



RC-N2-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	394.36	2.7
0.00015	589.34	4.1
0.00020	781.86	5.4
0.00025	971.22	6.7
0.00030	1156.80	8.0
0.00035	1338.03	9.2
0.00040	1514.40	10.4
0.00045	1685.45	11.6
0.00050	1850.81	12.8
0.00055	2010.13	13.9
0.00060	2163.14	14.9
0.00065	2309.65	15.9
0.00070	2449.48	16.9
0.00075	2582.54	17.8
0.00080	2708.76	18.7
0.00085	2828.14	19.5
0.00090	2940.70	20.3
0.00095	3046.52	21.0
0.00100	3145.69	21.7
0.00105	3238.34	22.3
0.00110	3324.62	22.9
0.00115	3404.71	23.5
0.00120	3478.79	24.0
0.00125	3547.07	24.5
0.00130	3609.75	24.9
0.00135	3667.08	25.3
0.00140	3719.26	25.6
0.00145	3766.53	26.0
0.00150	3809.13	26.3
0.00155	3847.27	26.5
0.00160	3881.19	26.8
0.00165	3911.12	27.0
0.00170	3937.26	27.1
0.00175	3959.83	27.3
0.00180	3979.05	27.4
0.00185	3995.11	27.5
0.00190	4008.19	27.6
0.00195	4018.50	27.7
0.00200	4026.20	27.8
0.00205	4031.47	27.8
0.00210	4034.46	27.8
0.00215	4035.34	27.8
0.00220	4022.24	27.7
0.00225	4007.91	27.6
0.00230	3991.75	27.5
0.00235	3973.92	27.4
0.00240	3954.57	27.3
0.00245	3933.85	27.1
0.00250	3911.89	27.0
0.00255	3888.81	26.8
0.00260	3864.72	26.6
0.00265	3839.74	26.5
0.00270	3813.97	26.3
0.00275	3787.50	26.1
0.00280	3760.41	25.9
0.00285	3732.78	25.7
0.00290	3704.70	25.5
0.00295	3676.23	25.3
0.00300	3647.43	25.1

$0.9 \times fc' = 27.8$ MPa = 4035.342197 psi

$Ec = 27{,}277.02$ MPa = 3956204.149 psi — 34599.35180 — 0.863233306

$Ec' = fc'/eo$ — 24791.17672

$= 12961.49296$ MPa = 1879909.016 psi

$\varepsilon 0 = 0.00215$

$\varepsilon cu = 0.00300$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 1.905415125$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4035.342197}{9000}$ untuk ec/eo >1

$k2 = 1.118371355$

$nk1 = 1.905415125$

$nk2 = 2.130961695$

Luas Kurva = $\int y$

Misal y = fc

$x = \varepsilon c$

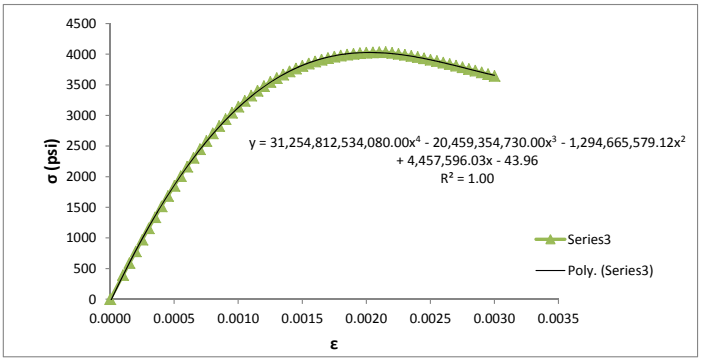
$y = 31{,}254{,}812{,}534{,}080\,x^4 + -20{,}459{,}354{,}730\,x^3 + -1{,}294{,}665{,}579.12\,x^2 + 4{,}457{,}596.03\,x + -44$

$\int y = 6{,}250{,}962{,}506{,}816\,x^5 + -5{,}114{,}838{,}683\,x^4 + -431{,}555{,}193\,x^3 + 2{,}228{,}798\,x^2 + -44\,x$

$A = 1.52 + -0.41 + -11.65 + 20.06 + -0.13$

$A = 9.38$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.912$



RC-N3-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	389.54	2.7
0.00015	576.56	4.0
0.00020	756.65	5.2
0.00025	929.01	6.4
0.00030	1093.12	7.5
0.00035	1248.67	8.6
0.00040	1395.51	9.6
0.00045	1533.63	10.6
0.00050	1663.13	11.5
0.00055	1784.18	12.3
0.00060	1897.03	13.1
0.00065	2001.97	13.8
0.00070	2099.33	14.5
0.00075	2189.46	15.1
0.00080	2272.70	15.7
0.00085	2349.44	16.2
0.00090	2420.04	16.7
0.00095	2484.86	17.1
0.00100	2544.25	17.5
0.00105	2598.56	17.9
0.00110	2648.11	18.3
0.00115	2693.21	18.6
0.00120	2734.18	18.9
0.00125	2771.29	19.1
0.00130	2804.80	19.3
0.00135	2834.98	19.5
0.00140	2862.05	19.7
0.00145	2886.25	19.9
0.00150	2907.77	20.0
0.00155	2926.81	20.2
0.00160	2943.56	20.3
0.00165	2958.19	20.4
0.00170	2970.84	20.5
0.00175	2981.67	20.6
0.00180	2990.81	20.6
0.00185	2998.38	20.7
0.00190	3004.52	20.7
0.00195	3009.32	20.7
0.00200	3012.88	20.8
0.00205	3015.31	20.8
0.00210	3016.68	20.8
0.00215	3017.08	20.8
0.00220	3016.18	20.8
0.00225	3014.49	20.8
0.00230	3012.03	20.8
0.00235	3010.37	20.8
0.00240	3006.92	20.7
0.00245	3002.88	20.7
0.00250	2998.30	20.7
0.00255	2993.20	20.6
0.00260	2987.64	20.6
0.00265	2981.66	20.6
0.00270	2975.29	20.5
0.00275	2968.56	20.5
0.00280	2961.50	20.4
0.00285	2954.14	20.4
0.00290	2946.51	20.3
0.00295	2938.63	20.3
0.00300	2930.53	20.2

$0.9 \times f_c' = 20.8$ MPa = 3017.078278 psi

$E_c = 27{,}277.02$ MPa = 3956204.149 psi

$E_c' = f_c'/e_o$

$= 9690.835859$ MPa = 1405539.451 psi

$\varepsilon_0 = 0.00215$

$\varepsilon_{cu} = 0.00300$

$n = \frac{E_c}{(E_c - E_c')}$

$n = 1.551048302$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{3017.078278}{9000}$ untuk ec/eo >1

$k2 = 1.00523092$

$nk1 = 1.551048302$

$nk2 = 1.559161712$

Luas Kurva = $\int y$

Misal y = fc

x = εc

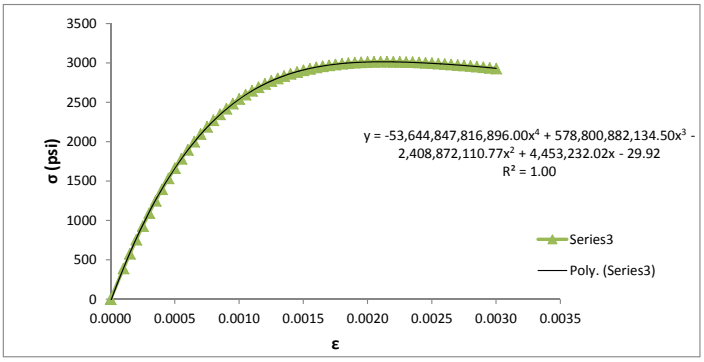
$y = -53{,}644{,}847{,}816{,}896\,x^4 + 578{,}800{,}882{,}135\,x^3 + -2{,}408{,}872{,}110.77\,x^2 + 4{,}453{,}232.02\,x + -30$

$\int y = -10{,}728{,}969{,}563{,}379\,x^5 + 144{,}700{,}220{,}534\,x^4 + -802{,}957{,}370\,x^3 + 2{,}226{,}616\,x^2 + -30\,x$

$A = -2.61 + 11.72 + -21.68 + 20.04 + -0.09$

$A = 7.38$

$B1 = \frac{A}{0.85 \times f_c' \times \varepsilon_{cu}} = 0.960$



RC-N4-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	394.59	2.7
0.00015	590.03	4.1
0.00020	783.32	5.4
0.00025	973.82	6.7
0.00030	1160.92	8.0
0.00035	1344.08	9.3
0.00040	1522.77	10.5
0.00045	1696.54	11.7
0.00050	1864.98	12.9
0.00055	2027.73	14.0
0.00060	2184.48	15.1
0.00065	2334.98	16.1
0.00070	2479.04	17.1
0.00075	2616.51	18.0
0.00080	2747.28	18.9
0.00085	2871.31	19.8
0.00090	2988.57	20.6
0.00095	3099.09	21.4
0.00100	3202.93	22.1
0.00105	3300.19	22.8
0.00110	3390.98	23.4
0.00115	3475.45	24.0
0.00120	3553.75	24.5
0.00125	3626.08	25.0
0.00130	3692.62	25.5
0.00135	3753.58	25.9
0.00140	3809.18	26.3
0.00145	3859.64	26.6
0.00150	3905.18	26.9
0.00155	3946.02	27.2
0.00160	3982.40	27.5
0.00165	4014.53	27.7
0.00170	4042.64	27.9
0.00175	4066.94	28.0
0.00180	4087.65	28.2
0.00185	4104.98	28.3
0.00190	4119.11	28.4
0.00195	4130.25	28.5
0.00200	4138.58	28.5
0.00205	4144.29	28.6
0.00210	4147.53	28.6
0.00215	4148.48	28.6
0.00220	4133.62	28.5
0.00225	4117.43	28.4
0.00230	4099.22	28.3
0.00235	4079.17	28.1
0.00240	4057.45	28.0
0.00245	4034.22	27.8
0.00250	4009.62	27.6
0.00255	3983.80	27.5
0.00260	3956.87	27.3
0.00265	3928.97	27.1
0.00270	3900.21	26.9
0.00275	3870.69	26.7
0.00280	3840.50	26.5
0.00285	3809.75	26.3
0.00290	3778.51	26.1
0.00295	3746.86	25.8
0.00300	3714.87	25.6

0.9 x fc' = 28.6 MPa = 4148.482633 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 13324.89931 MPa = 1932616.746 psi

ε0 = 0.00215

εcu = 0.00300

$n = \frac{Ec}{(Ec-Ec')}$

n = 1.955044859

k1 = 1 untuk ec/eo <1

$k2 = 0.67 + \frac{4148.482633}{9000}$ untuk ec/eo >1

k2 = 1.130942515

nk1 = 1.955044859

nk2 = 2.211043349

Luas Kurva = ∫y

Misal y = fc

x = εc

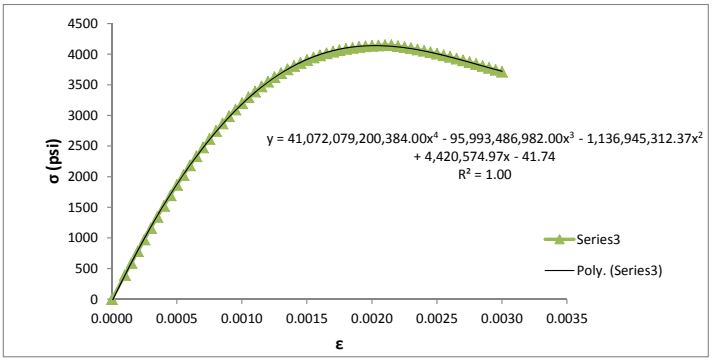
y = 41,072,079,200,384.00 x^4 + -95,993,486,982.00 x^3 + -1,136,945,312.37 x^2 + 4,420,574.97 x + -42

∫y = 8,214,415,840,077 x^5 + -23,998,371,746 x^4 + -378,981,771 x^3 + 2,210,287 x^2 + -42 x

A = 2.00 + -1.94 + -10.23 + 19.89 + -0.13

A = 9.59

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.906$



RC-N5-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.54	2.7
0.00015	593.08	4.1
0.00020	790.25	5.4
0.00025	986.83	6.8
0.00030	1182.57	8.2
0.00035	1377.20	9.5
0.00040	1570.41	10.8
0.00045	1761.87	12.1
0.00050	1951.23	13.5
0.00055	2138.14	14.7
0.00060	2322.23	16.0
0.00065	2503.11	17.3
0.00070	2680.42	18.5
0.00075	2853.78	19.7
0.00080	3022.81	20.8
0.00085	3187.17	22.0
0.00090	3346.50	23.1
0.00095	3500.48	24.1
0.00100	3648.80	25.2
0.00105	3791.19	26.1
0.00110	3927.39	27.1
0.00115	4057.17	28.0
0.00120	4180.34	28.8
0.00125	4296.75	29.6
0.00130	4406.26	30.4
0.00135	4508.79	31.1
0.00140	4604.27	31.7
0.00145	4692.69	32.4
0.00150	4774.04	32.9
0.00155	4848.38	33.4
0.00160	4915.77	33.9
0.00165	4976.30	34.3
0.00170	5030.11	34.7
0.00175	5077.34	35.0
0.00180	5118.17	35.3
0.00185	5152.77	35.5
0.00190	5181.37	35.7
0.00195	5204.16	35.9
0.00200	5221.40	36.0
0.00205	5233.31	36.1
0.00210	5240.15	36.1
0.00215	5242.16	36.1
0.00220	5205.72	35.9
0.00225	5165.60	35.6
0.00230	5120.13	35.3
0.00235	5069.78	35.0
0.00240	5015.00	34.6
0.00245	4956.23	34.2
0.00250	4893.92	33.7
0.00255	4828.48	33.3
0.00260	4760.32	32.8
0.00265	4689.81	32.3
0.00270	4617.32	31.8
0.00275	4543.19	31.3
0.00280	4467.75	30.8

0.9 x fc' = 36.1 MPa = 5242.173509 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 16837.8273 MPa = 2442124.797 psi

ε0 = 0.00215

εcu = 0.00280

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.612943729

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5242.173509}{9000}$$ untuk ec/eo >1

k2 = 1.252463723

nk1 = 2.612943729

nk2 = 3.272617232

Luas Kurva = ∫y

Misal y = fc

x = εc

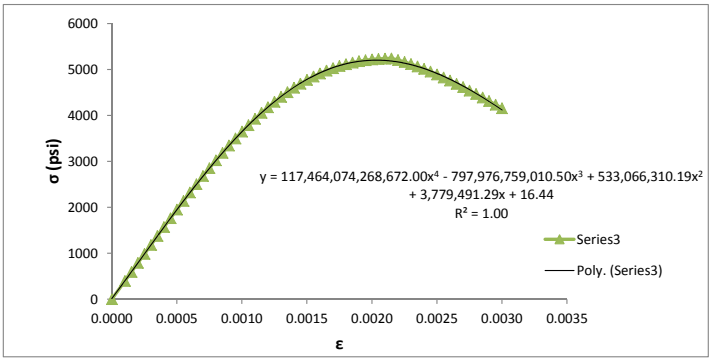
y = 117,464,074,268,672 x^4 + -797,976,759,010.50 x^3 + 533,066,310.19 x^2 + 3,779,491.29 x + 16.4

∫y = 23,492,814,853,734 x^5 + -199,494,189,753 x^4 + 177,688,770 x^3 + 1,889,746 x^2 + 16.4 x

A = 4.04 + -12.26 + 3.90 + 14.82 + 0.05

A = 10.54

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.845$$



RC-N5-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.60	2.7
0.00015	593.34	4.1
0.00020	790.96	5.5
0.00025	988.36	6.8
0.00030	1185.41	8.2
0.00035	1381.96	9.5
0.00040	1577.84	10.9
0.00045	1772.83	12.2
0.00050	1966.69	13.6
0.00055	2159.17	14.9
0.00060	2349.98	16.2
0.00065	2538.80	17.5
0.00070	2725.32	18.8
0.00075	2909.18	20.1
0.00080	3090.02	21.3
0.00085	3267.46	22.5
0.00090	3441.13	23.7
0.00095	3610.64	24.9
0.00100	3775.59	26.0
0.00105	3935.60	27.1
0.00110	4090.30	28.2
0.00115	4239.31	29.2
0.00120	4382.28	30.2
0.00125	4518.89	31.2
0.00130	4648.82	32.1
0.00135	4771.80	32.9
0.00140	4887.57	33.7
0.00145	4995.92	34.4
0.00150	5096.67	35.1
0.00155	5189.68	35.8
0.00160	5274.83	36.4
0.00165	5352.08	36.9
0.00170	5421.38	37.4
0.00175	5482.76	37.8
0.00180	5536.27	38.2
0.00185	5582.01	38.5
0.00190	5620.09	38.7
0.00195	5650.67	39.0
0.00200	5673.95	39.1
0.00205	5690.15	39.2
0.00210	5699.50	39.3
0.00215	5702.26	39.3
0.00220	5653.86	39.0
0.00225	5599.37	38.6
0.00230	5536.63	38.2
0.00235	5466.34	37.7
0.00240	5389.18	37.2
0.00245	5305.85	36.6
0.00250	5217.05	36.0
0.00255	5123.50	35.3
0.00260	5025.85	34.7
0.00265	4924.77	34.0
0.00270	4820.88	33.2

0.9 x fc' = 39.3 MPa = 5702.277946 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 18315.67977 MPa = 2656469.563 psi

ε0 = 0.00215

εcu = 0.00270

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 3.043855408

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5702.277946}{9000}$$ untuk ec/eo >1

k2 = 1.303586438

nk1 = 3.043855408

nk2 = 3.967928631

Luas Kurva = ∫y

Misal y = fc

x = εc

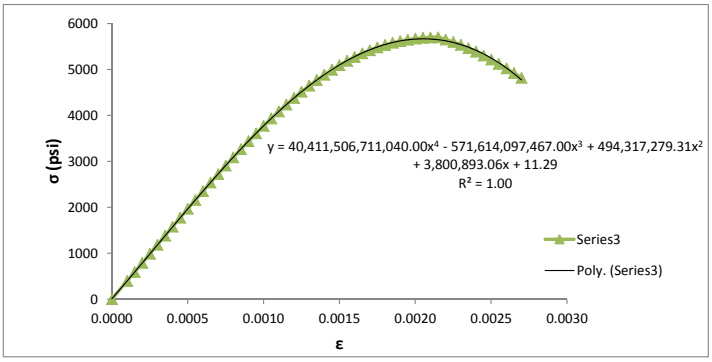
y = 40,411,506,711,040 x^4 + -571,614,097,467 x^3 + 494,317,279.31 x^2 + 3,800,893.06 x + 11.3

∫y = 8,082,301,342,208 x^5 + -142,903,524,367 x^4 + 164,772,426 x^3 + 1,900,447 x^2 + 11.3 x

A = 1.16 + -7.59 + 3.24 + 13.85 + 0.03

A = 10.69

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.817$$



RC-N6-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.62	2.7
0.00015	593.41	4.1
0.00020	791.16	5.5
0.00025	988.83	6.8
0.00030	1186.37	8.2
0.00035	1383.68	9.5
0.00040	1580.68	10.9
0.00045	1777.24	12.3
0.00050	1973.20	13.6
0.00055	2168.40	15.0
0.00060	2362.64	16.3
0.00065	2555.68	17.6
0.00070	2747.26	18.9
0.00075	2937.12	20.3
0.00080	3124.94	21.5
0.00085	3310.38	22.8
0.00090	3493.09	24.1
0.00095	3672.69	25.3
0.00100	3848.79	26.5
0.00105	4020.96	27.7
0.00110	4188.78	28.9
0.00115	4351.81	30.0
0.00120	4509.61	31.1
0.00125	4661.75	32.1
0.00130	4807.78	33.1
0.00135	4947.28	34.1
0.00140	5079.84	35.0
0.00145	5205.08	35.9
0.00150	5322.62	36.7
0.00155	5432.15	37.5
0.00160	5533.36	38.2
0.00165	5625.99	38.8
0.00170	5709.85	39.4
0.00175	5784.77	39.9
0.00180	5850.63	40.3
0.00185	5907.37	40.7
0.00190	5954.98	41.1
0.00195	5993.51	41.3
0.00200	6023.03	41.5
0.00205	6043.71	41.7
0.00210	6055.71	41.8
0.00215	6059.28	41.8
0.00220	6000.08	41.4
0.00225	5931.71	40.9
0.00230	5851.61	40.3
0.00235	5760.68	39.7
0.00240	5659.89	39.0
0.00245	5550.25	38.3
0.00250	5432.83	37.5
0.00255	5308.70	36.6
0.00260	5178.91	35.7
0.00265	5044.52	34.8

0.9 x fc' = 41.8 MPa = 6059.298876 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 19462.42868 MPa = 2822791.731 psi

ε0 = 0.00215

εcu = 0.00265

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 3.490524797

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{6059.298876}{9000}$$ untuk ec/eo >1

k2 = 1.343255431

nk1 = 3.490524797

nk2 = 4.68866639

Luas Kurva = ∫y

Misal y = fc

x = εc

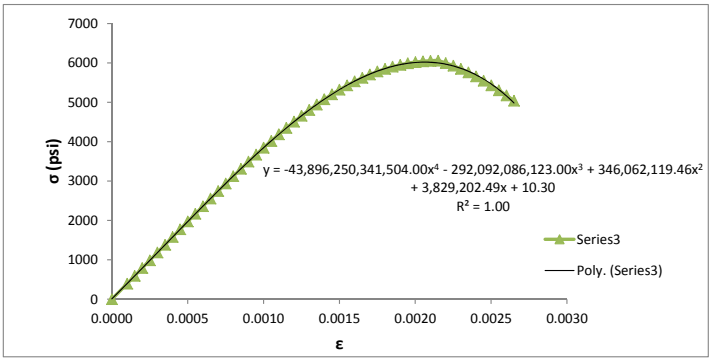
y = -43,896,250,341,504 x^4 + -292,092,086,123 x^3 + 346,062,119.46 x^2 + 3,829,202.49 x + 10.3

∫y = -8,779,250,068,301 x^5 + -73,023,021,531 x^4 + 115,354,040 x^3 + 1,914,601 x^2 + 10.3 x

A = -1.15 + -3.60 + 2.15 + 13.45 + 0.03

A = 10.87

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.796$$



RC-N6-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	394.10	2.7
0.00015	588.60	4.1
0.00020	780.31	5.4
0.00025	968.50	6.7
0.00030	1152.52	7.9
0.00035	1331.81	9.2
0.00040	1505.84	10.4
0.00045	1674.20	11.5
0.00050	1836.51	12.7
0.00055	1992.48	13.7
0.00060	2141.87	14.8
0.00065	2284.50	15.8
0.00070	2420.28	16.7
0.00075	2549.13	17.6
0.00080	2671.04	18.4
0.00085	2786.04	19.2
0.00090	2894.21	20.0
0.00095	2995.64	20.7
0.00100	3090.47	21.3
0.00105	3178.87	21.9
0.00110	3261.00	22.5
0.00115	3337.08	23.0
0.00120	3407.30	23.5
0.00125	3471.90	23.9
0.00130	3531.11	24.3
0.00135	3585.15	24.7
0.00140	3634.26	25.1
0.00145	3678.68	25.4
0.00150	3718.64	25.6
0.00155	3754.38	25.9
0.00160	3786.12	26.1
0.00165	3814.08	26.3
0.00170	3838.48	26.5
0.00175	3859.53	26.6
0.00180	3877.43	26.7
0.00185	3892.37	26.8
0.00190	3904.54	26.9
0.00195	3914.12	27.0
0.00200	3921.27	27.0
0.00205	3926.15	27.1
0.00210	3928.93	27.1
0.00215	3929.74	27.1
0.00220	3918.21	27.0
0.00225	3905.52	26.9
0.00230	3891.17	26.8
0.00235	3875.29	26.7
0.00240	3858.03	26.6
0.00245	3839.51	26.5
0.00250	3819.85	26.3
0.00255	3799.16	26.2
0.00260	3777.56	26.0
0.00265	3755.12	25.9
0.00270	3731.95	25.7
0.00275	3708.13	25.6
0.00280	3683.74	25.4
0.00285	3658.84	25.2
0.00290	3633.51	25.1
0.00295	3607.81	24.9
0.00300	3581.79	24.7

$0.9 \times fc' = 27.1$ MPa = 3929.744458 psi

$Ec = 27{,}277.02$ MPa = 3956204.149 psi

$Ec' = fc'/eo$

$= 12622.31371$ MPa = 1830715.135 psi

$\varepsilon 0 = 0.00215$

$\varepsilon cu = 0.00300$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 1.861314796$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{3929.744458}{9000}$ untuk ec/eo >1

$k2 = 1.106638273$

$nk1 = 1.861314796$

$nk2 = 2.059802191$

Luas Kurva = $\int y$

Misal y = fc

$x = \varepsilon c$

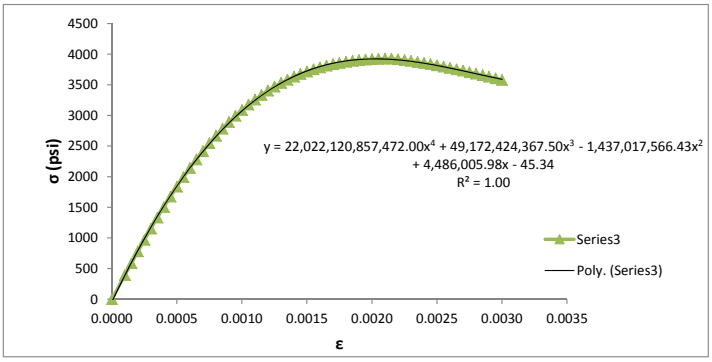
$y = 22{,}022{,}120{,}857{,}472\,x^4 + 49{,}172{,}424{,}368\,x^3 + -1{,}437{,}017{,}566.43\,x^2 + 4{,}486{,}005.98\,x + -45$

$\int y = 4{,}404{,}424{,}171{,}494\,x^5 + 12{,}293{,}106{,}092\,x^4 + -479{,}005{,}855\,x^3 + 2{,}243{,}003\,x^2 + -45\,x$

$A = 1.07 + 1.00 + -12.93 + 20.19 + -0.14$

$A = 9.18$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.916$



RC-N7-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.48	2.7
0.00015	592.88	4.1
0.00020	789.74	5.4
0.00025	985.79	6.8
0.00030	1180.72	8.1
0.00035	1374.21	9.5
0.00040	1565.89	10.8
0.00045	1755.40	12.1
0.00050	1942.35	13.4
0.00055	2126.36	14.7
0.00060	2307.03	15.9
0.00065	2484.00	17.1
0.00070	2656.87	18.3
0.00075	2825.27	19.5
0.00080	2988.87	20.6
0.00085	3147.33	21.7
0.00090	3300.33	22.8
0.00095	3447.60	23.8
0.00100	3588.88	24.7
0.00105	3723.95	25.7
0.00110	3852.60	26.6
0.00115	3974.69	27.4
0.00120	4090.09	28.2
0.00125	4198.70	28.9
0.00130	4300.46	29.7
0.00135	4395.36	30.3
0.00140	4483.39	30.9
0.00145	4564.59	31.5
0.00150	4639.04	32.0
0.00155	4706.82	32.5
0.00160	4768.06	32.9
0.00165	4822.88	33.3
0.00170	4871.46	33.6
0.00175	4913.98	33.9
0.00180	4950.62	34.1
0.00185	4981.59	34.3
0.00190	5007.12	34.5
0.00195	5027.43	34.7
0.00200	5042.74	34.8
0.00205	5053.31	34.8
0.00210	5059.36	34.9
0.00215	5059.25	34.9
0.00220	5028.89	34.7
0.00225	4993.60	34.4
0.00230	4953.77	34.2
0.00235	4909.81	33.9
0.00240	4862.10	33.5
0.00245	4811.02	33.2
0.00250	4756.93	32.8
0.00255	4700.17	32.4
0.00260	4641.08	32.0
0.00265	4579.97	31.6
0.00270	4517.14	31.1
0.00275	4452.86	30.7
0.00280	4387.40	30.3
0.00285	4320.99	29.8

0.9 x fc' = 34.9 MPa = 5061.148812 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 16256.37715 MPa = 2357792.43 psi

ε0 = 0.00215

εcu = 0.00285

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.475084549

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5061.148812}{9000}$$ untuk ec/eo >1

k2 = 1.232349868

nk1 = 2.475084549

nk2 = 3.050170117

Luas Kurva = ∫y

Misal y = fc

x = εc

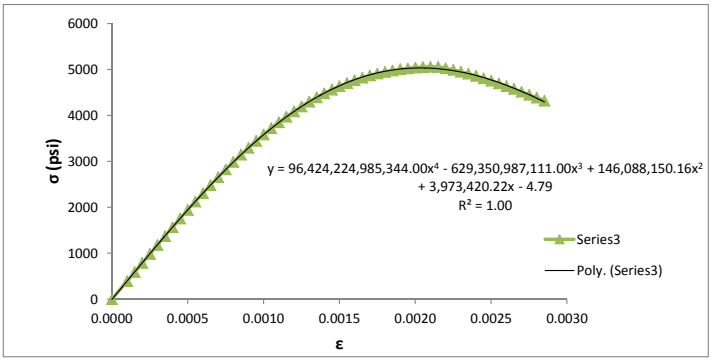
y = 96,424,224,985,344 x^4 + -629,350,987,111.00 x^3 + 146,088,150.16 x^2 + 3,973,420.22 x + -4.8

∫y = 19,284,844,997,069 x^5 + -157,337,746,778 x^4 + 48,696,050 x^3 + 1,986,710 x^2 + -4.8 x

A = 3.63 + -10.38 + 1.13 + 16.14 + -0.01

A = 10.50

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.856$$



RC-N7-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.48	2.7
0.00015	592.88	4.1
0.00020	789.74	5.4
0.00025	985.79	6.8
0.00030	1180.72	8.1
0.00035	1374.21	9.5
0.00040	1565.89	10.8
0.00045	1755.40	12.1
0.00050	1942.35	13.4
0.00055	2126.36	14.7
0.00060	2307.03	15.9
0.00065	2484.00	17.1
0.00070	2656.87	18.3
0.00075	2825.27	19.5
0.00080	2988.87	20.6
0.00085	3147.33	21.7
0.00090	3300.33	22.8
0.00095	3447.60	23.8
0.00100	3588.88	24.7
0.00105	3723.95	25.7
0.00110	3852.60	26.6
0.00115	3974.69	27.4
0.00120	4090.09	28.2
0.00125	4198.70	28.9
0.00130	4300.46	29.7
0.00135	4395.36	30.3
0.00140	4483.39	30.9
0.00145	4564.59	31.5
0.00150	4639.04	32.0
0.00155	4706.82	32.5
0.00160	4768.06	32.9
0.00165	4822.88	33.3
0.00170	4871.46	33.6
0.00175	4913.98	33.9
0.00180	4950.62	34.1
0.00185	4981.59	34.3
0.00190	5007.12	34.5
0.00195	5027.43	34.7
0.00200	5042.74	34.8
0.00205	5053.31	34.8
0.00210	5059.36	34.9
0.00215	5061.14	34.9
0.00220	5028.89	34.7
0.00225	4993.60	34.4
0.00230	4953.77	34.2
0.00235	4909.81	33.9
0.00240	4862.10	33.5
0.00245	4811.02	33.2
0.00250	4756.93	32.8
0.00255	4700.17	32.4
0.00260	4641.08	32.0
0.00265	4579.97	31.6
0.00270	4517.14	31.1
0.00275	4452.86	30.7
0.00280	4387.40	30.3
0.00285	4320.99	29.8

0.9 x fc' = 34.9 MPa = 5061.148812 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 16256.37715 MPa = 2357792.43 psi

ε0 = 0.00215

εcu = 0.00285

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.475084549

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5061.148812}{9000}$$ untuk ec/eo >1

k2 = 1.232349868

nk1 = 2.475084549

nk2 = 3.050170117

Luas Kurva = ∫y

Misal y = fc

x = εc

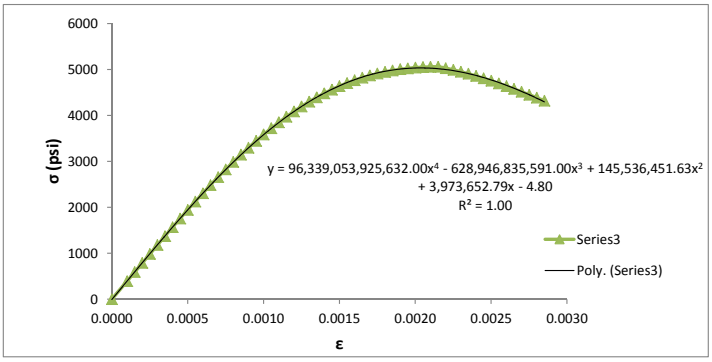
y = 96,339,053,925,632.00 x^4 + -628,946,835,591 x^3 + 145,536,451.63 x^2 + 3,973,652.70 x + -4.8

∫y = 19,267,810,785,126 x^5 + -157,236,708,898 x^4 + 48,512,151 x^3 + 1,986,826 x^2 + -4.8 x

A = 3.62 + -10.37 + 1.12 + 16.14 + -0.01

A = 10.50

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.856$$



RC-N8-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.42	2.7
0.00015	592.63	4.1
0.00020	789.14	5.4
0.00025	984.60	6.8
0.00030	1178.66	8.1
0.00035	1370.93	9.5
0.00040	1561.02	10.8
0.00045	1748.53	12.1
0.00050	1933.04	13.3
0.00055	2114.17	14.6
0.00060	2291.50	15.8
0.00065	2464.66	17.0
0.00070	2633.28	18.2
0.00075	2797.00	19.3
0.00080	2955.51	20.4
0.00085	3108.50	21.4
0.00090	3255.71	22.4
0.00095	3396.89	23.4
0.00100	3531.84	24.4
0.00105	3660.40	25.2
0.00110	3782.41	26.1
0.00115	3897.78	26.9
0.00120	4006.44	27.6
0.00125	4108.35	28.3
0.00130	4203.52	29.0
0.00135	4291.96	29.6
0.00140	4373.74	30.2
0.00145	4448.95	30.7
0.00150	4517.68	31.1
0.00155	4580.07	31.6
0.00160	4636.28	32.0
0.00165	4686.47	32.3
0.00170	4730.83	32.6
0.00175	4769.56	32.9
0.00180	4802.86	33.1
0.00185	4830.94	33.3
0.00190	4854.04	33.5
0.00195	4872.39	33.6
0.00200	4886.20	33.7
0.00205	4895.71	33.8
0.00210	4901.15	33.8
0.00215	4902.74	33.8
0.00220	4873.95	33.6
0.00225	4842.56	33.4
0.00230	4807.25	33.1
0.00235	4768.35	32.9
0.00240	4726.21	32.6
0.00245	4681.14	32.3
0.00250	4633.46	31.9
0.00255	4583.46	31.6
0.00260	4531.42	31.2
0.00265	4477.60	30.9
0.00270	4422.26	30.5
0.00275	4365.63	30.1
0.00280	4307.92	29.7
0.00285	4249.34	29.3
0.00290	4190.07	28.9
0.00295	4130.29	28.5

0.9 x fc' = 33.8 MPa = 4902.752202 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 15747.60827 MPa = 2284001.608 psi

ε0 = 0.00215

εcu = 0.00295

$n = \frac{Ec}{(Ec-Ec')}$

n = 2.365864214

k1 = 1 untuk ec/eo <1

$k2 = 0.67 + \frac{4902.752202}{9000}$ untuk ec/eo >1

k2 = 1.214750245

nk1 = 2.365864214

nk2 = 2.873934133

Luas Kurva = ∫y

Misal y = fc

x = εc

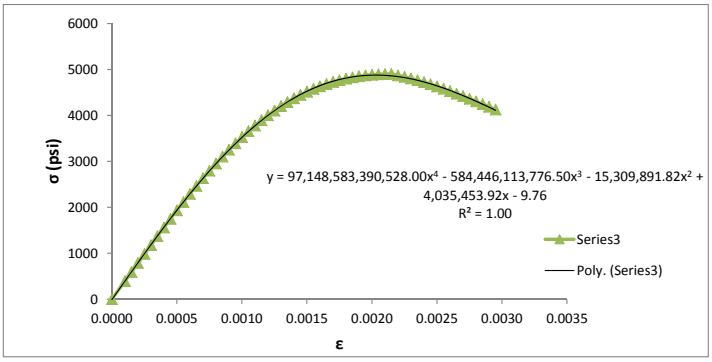
y = 97,148,583,390,528 x^4 + -584,446,113,777 x^3 + -15,309,891.82 x^2 + 4,035,453.92 x + -9.8

∫y = 19,429,716,678,106 x^5 + -146,111,528,444 x^4 + -5,103,297 x^3 + 2,017,727 x^2 + -9.8 x

A = 4.34 + -11.07 + -0.13 + 17.56 + -0.03

A = 10.67

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.868$



RC-N8-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.53	2.7
0.00015	593.04	4.1
0.00020	790.15	5.4
0.00025	986.64	6.8
0.00030	1182.23	8.2
0.00035	1376.64	9.5
0.00040	1569.55	10.8
0.00045	1760.63	12.1
0.00050	1949.52	13.4
0.00055	2135.86	14.7
0.00060	2319.28	16.0
0.00065	2499.38	17.2
0.00070	2675.80	18.4
0.00075	2848.17	19.6
0.00080	3016.10	20.8
0.00085	3179.26	21.9
0.00090	3337.30	23.0
0.00095	3489.91	24.1
0.00100	3636.79	25.1
0.00105	3777.66	26.0
0.00110	3912.29	27.0
0.00115	4040.47	27.9
0.00120	4162.02	28.7
0.00125	4276.79	29.5
0.00130	4384.68	30.2
0.00135	4485.59	30.9
0.00140	4579.49	31.6
0.00145	4666.38	32.2
0.00150	4746.26	32.7
0.00155	4819.19	33.2
0.00160	4885.26	33.7
0.00165	4944.57	34.1
0.00170	4997.25	34.5
0.00175	5043.47	34.8
0.00180	5083.39	35.0
0.00185	5117.20	35.3
0.00190	5145.13	35.5
0.00195	5167.39	35.6
0.00200	5184.20	35.7
0.00205	5195.82	35.8
0.00210	5202.49	35.9
0.00215	5204.45	35.9
0.00220	5168.91	35.6
0.00225	5129.82	35.4
0.00230	5085.58	35.1
0.00235	5036.61	34.7
0.00240	4983.37	34.4
0.00245	4926.29	34.0
0.00250	4865.77	33.5
0.00255	4802.24	33.1
0.00260	4736.06	32.7
0.00265	4667.61	32.2
0.00270	4597.24	31.7
0.00275	4525.28	31.2
0.00280	4452.01	30.7

0.9 x fc' = 35.9 MPa = 5204.46003 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 16716.69186 MPa = 2424555.554 psi

ε0 = 0.00215

εcu = 0.00280

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.58297116

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5204.46003}{9000}$$ untuk ec/eo >1

k2 = 1.248273337

nk1 = 2.58297116

nk2 = 3.224254028

Luas Kurva = ∫y

Misal y = fc

x = εc

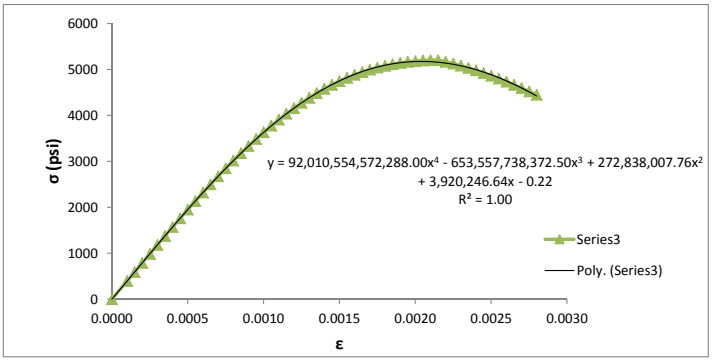
y = 92,010,554,572,288 x^4 + -653,557,738,373 x^3 + 272,838,007.76 x^2 + 3,920,246.64 x + -0.2

∫y = 18,402,110,914,458 x^5 + -163,389,434,593 x^4 + 90,946,003 x^3 + 1,960,123 x^2 + -0.2 x

A = 3.17 + -10.04 + 2.00 + 15.37 + 0.00

A = 10.49

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.847$$



RC-N9-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.48	2.7
0.00015	592.87	4.1
0.00020	789.71	5.4
0.00025	985.74	6.8
0.00030	1180.63	8.1
0.00035	1374.07	9.5
0.00040	1565.68	10.8
0.00045	1755.09	12.1
0.00050	1941.94	13.4
0.00055	2125.82	14.7
0.00060	2306.34	15.9
0.00065	2483.13	17.1
0.00070	2655.81	18.3
0.00075	2824.00	19.5
0.00080	2987.36	20.6
0.00085	3145.56	21.7
0.00090	3298.30	22.7
0.00095	3445.28	23.8
0.00100	3586.26	24.7
0.00105	3721.02	25.7
0.00110	3849.36	26.5
0.00115	3971.13	27.4
0.00120	4086.20	28.2
0.00125	4194.49	28.9
0.00130	4295.93	29.6
0.00135	4390.52	30.3
0.00140	4478.25	30.9
0.00145	4559.16	31.4
0.00150	4633.33	31.9
0.00155	4700.85	32.4
0.00160	4761.83	32.8
0.00165	4816.43	33.2
0.00170	4864.80	33.5
0.00175	4907.13	33.8
0.00180	4943.60	34.1
0.00185	4974.44	34.3
0.00190	4999.84	34.5
0.00195	5020.05	34.6
0.00200	5035.29	34.7
0.00205	5045.81	34.8
0.00210	5051.83	34.8
0.00215	5053.60	34.8
0.00220	5021.52	34.6
0.00225	4986.42	34.4
0.00230	4946.82	34.1
0.00235	4903.11	33.8
0.00240	4855.68	33.5
0.00245	4804.90	33.1
0.00250	4751.12	32.8
0.00255	4694.70	32.4
0.00260	4635.97	32.0
0.00265	4575.23	31.5
0.00270	4512.77	31.1
0.00275	4448.87	30.7
0.00280	4383.80	30.2
0.00285	4317.78	29.8

0.9 x fc' = 34.8 MPa = 5053.606116 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 16232.15006 MPa = 2354278.581 psi

ε0 = 0.00215

εcu = 0.00285

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.469655412

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5053.606116}{9000}$$ untuk ec/eo >1

k2 = 1.231511791

nk1 = 2.469655412

nk2 = 3.041409759

Luas Kurva = ∫y

Misal y = fc

x = εc

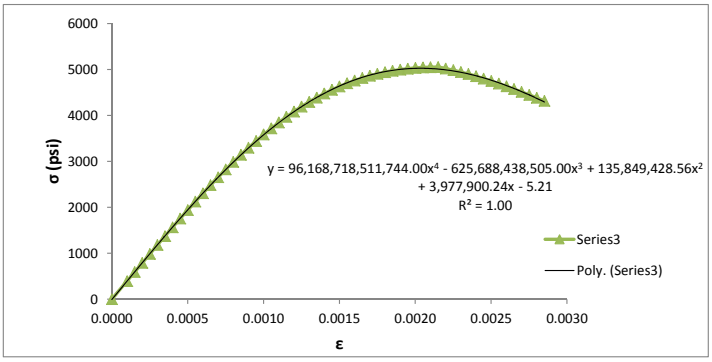
y = 96,168,718,511,744 x^4 + -625,688,438,505 x^3 + 135,849,428.56 x^2 + 3,977,900.24 x + -5.2

∫y = 19,233,743,702,349 x^5 + -156,422,109,626 x^4 + 45,283,143 x^3 + 1,988,950 x^2 + -5.2 x

A = 3.62 + -10.32 + 1.05 + 16.16 + -0.01

A = 10.49

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.856$$



RC-N10-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.56	2.7
0.00015	593.17	4.1
0.00020	790.49	5.5
0.00025	987.34	6.8
0.00030	1183.49	8.2
0.00035	1378.72	9.5
0.00040	1572.73	10.8
0.00045	1765.24	12.2
0.00050	1955.92	13.5
0.00055	2144.43	14.8
0.00060	2330.42	16.1
0.00065	2513.53	17.3
0.00070	2693.38	18.6
0.00075	2869.61	19.8
0.00080	3041.82	21.0
0.00085	3209.66	22.1
0.00090	3372.76	23.3
0.00095	3530.78	24.3
0.00100	3683.38	25.4
0.00105	3830.26	26.4
0.00110	3971.11	27.4
0.00115	4105.68	28.3
0.00120	4233.74	29.2
0.00125	4355.08	30.0
0.00130	4469.54	30.8
0.00135	4576.96	31.6
0.00140	4677.26	32.2
0.00145	4770.37	32.9
0.00150	4856.25	33.5
0.00155	4934.91	34.0
0.00160	5006.37	34.5
0.00165	5070.71	35.0
0.00170	5128.03	35.4
0.00175	5178.44	35.7
0.00180	5222.09	36.0
0.00185	5259.16	36.3
0.00190	5289.85	36.5
0.00195	5314.35	36.6
0.00200	5332.91	36.8
0.00205	5345.75	36.9
0.00210	5353.13	36.9
0.00215	5355.30	36.9
0.00220	5316.10	36.7
0.00225	5272.74	36.4
0.00230	5223.45	36.0
0.00235	5168.73	35.6
0.00240	5109.09	35.2
0.00245	5045.02	34.8
0.00250	4977.02	34.3
0.00255	4905.55	33.8
0.00260	4831.08	33.3
0.00265	4754.03	32.8
0.00270	4674.82	32.2
0.00275	4593.85	31.7
0.00280	4511.46	31.1

0.9 x fc' = 36.9 MPa = 5355.313944 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 17201.23365 MPa = 2494832.526 psi

ε0 = 0.00215

εcu = 0.00280

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.707185556

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{5355.313944}{9000}$$ untuk ec/eo >1

k2 = 1.265034883

nk1 = 2.707185556

nk2 = 3.424684162

Luas Kurva = ∫y

Misal y = fc

x = εc

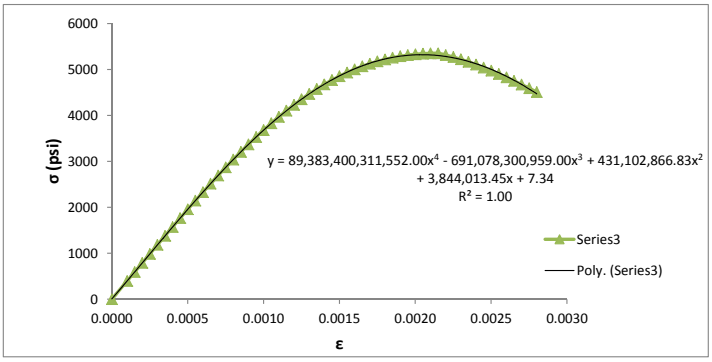
y = 89,383,400,311,552.00 x^4 + -691,078,300,959.00 x^3 + 431,102,866.83 x^2 + 3,844,013.45 x + 7.34

∫y = 17,876,680,062,310 x^5 + -172,769,575,240 x^4 + 143,700,956 x^3 + 1,922,007 x^2 + 7.34 x

A = 3.08 + -10.62 + 3.15 + 15.07 + 0.02

A = 10.70

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.840$$



RC-N10-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	395.53	2.7
0.00015	593.04	4.1
0.00020	790.15	5.4
0.00025	986.64	6.8
0.00030	1182.23	8.2
0.00035	1376.64	9.5
0.00040	1569.55	10.8
0.00045	1760.63	12.1
0.00050	1949.52	13.4
0.00055	2135.86	14.7
0.00060	2319.28	16.0
0.00065	2499.38	17.2
0.00070	2675.80	18.4
0.00075	2848.17	19.6
0.00080	3016.10	20.8
0.00085	3179.26	21.9
0.00090	3337.30	23.0
0.00095	3489.91	24.1
0.00100	3636.79	25.1
0.00105	3777.66	26.0
0.00110	3912.29	27.0
0.00115	4040.47	27.9
0.00120	4162.02	28.7
0.00125	4276.79	29.5
0.00130	4384.68	30.2
0.00135	4485.59	30.9
0.00140	4579.49	31.6
0.00145	4666.38	32.2
0.00150	4746.26	32.7
0.00155	4819.19	33.2
0.00160	4885.26	33.7
0.00165	4944.57	34.1
0.00170	4997.25	34.5
0.00175	5043.47	34.8
0.00180	5083.39	35.0
0.00185	5117.20	35.3
0.00190	5145.13	35.5
0.00195	5167.39	35.6
0.00200	5184.20	35.7
0.00205	5195.82	35.8
0.00210	5202.49	35.9
0.00215	5204.45	35.9
0.00220	5168.91	35.6
0.00225	5129.82	35.4
0.00230	5085.58	35.1
0.00235	5036.61	34.7
0.00240	4983.37	34.4
0.00245	4926.29	34.0
0.00250	4865.77	33.5
0.00255	4802.24	33.1
0.00260	4736.06	32.7
0.00265	4667.61	32.2
0.00270	4597.24	31.7
0.00275	4525.28	31.2
0.00280	4452.01	30.7

0.9 x fc' = 35.9 MPa = 5204.46003 psi

Ec = 27,277.02 MPa = 3956204.149 psi

Ec' = fc'/eo

= 16716.69186 MPa = 2424555.554 psi

ε0 = 0.00215

εcu = 0.00280

n = Ec / (Ec-Ec')

n = 2.58297116

k1 = 1 untuk ec/eo <1

k2 = 0.67 + 5204.46003 / 9000 untuk ec/eo >1

k2 = 1.248273337

nk1 = 2.58297116

nk2 = 3.224254028

Luas Kurva = ∫y

Misal y = fc

x = εc

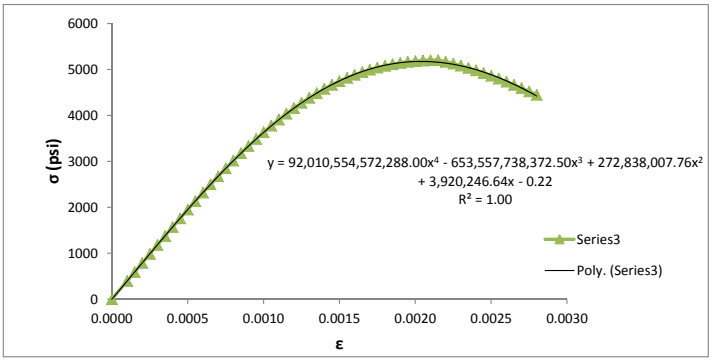
y = 92,010,554,572,288 x^4 + -653,557,738,373 x^3 + 272,838,007.76 x^2 + 3,920,246.64 x + -0.2

∫y = 18,402,110,914,458 x^5 + -163,389,434,593 x^4 + 90,946,003 x^3 + 1,960,123 x^2 + -0.2 x

A = 3.17 + -10.04 + 2.00 + 15.37 + 0.00

A = 10.49

B1 = A / (0.85 x fc' x εcu) = 0.847



RC-O1-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.97	2.6
0.00015	575.74	4.0
0.00020	767.16	5.3
0.00025	957.99	6.6
0.00030	1147.94	7.9
0.00035	1336.69	9.2
0.00040	1523.89	10.5
0.00045	1709.12	11.8
0.00050	1891.97	13.0
0.00055	2071.98	14.3
0.00060	2248.69	15.5
0.00065	2421.62	16.7
0.00070	2590.27	17.9
0.00075	2754.17	19.0
0.00080	2912.85	20.1
0.00085	3065.84	21.1
0.00090	3212.72	22.2
0.00095	3353.06	23.1
0.00100	3486.50	24.0
0.00105	3612.70	24.9
0.00110	3731.38	25.7
0.00115	3842.29	26.5
0.00120	3945.24	27.2
0.00125	4040.09	27.9
0.00130	4126.75	28.5
0.00135	4205.20	29.0
0.00140	4275.44	29.5
0.00145	4337.54	29.9
0.00150	4391.62	30.3
0.00155	4437.83	30.6
0.00160	4476.37	30.9
0.00165	4507.48	31.1
0.00170	4531.42	31.2
0.00175	4548.47	31.4
0.00180	4558.96	31.4
0.00185	4563.20	31.5
0.00190	4543.95	31.3
0.00195	4513.19	31.1
0.00200	4476.03	30.9
0.00205	4433.01	30.6
0.00210	4384.69	30.2
0.00215	4331.63	29.9
0.00220	4274.36	29.5
0.00225	4213.39	29.1
0.00230	4149.24	28.6
0.00235	4082.35	28.1
0.00240	4013.20	27.7
0.00245	3942.18	27.2
0.00250	3869.70	26.7

$0.9 \times fc' = 31.5$ MPa = 4563.330896 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 16910.54158$ MPa = 2452671.13 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00250$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.767478633$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4563.330896}{9000}$ untuk ec/eo >1

$k2 = 1.177036766$

$nk1 = 2.767478633$

$nk2 = 3.257424101$

Luas Kurva = $\int y$

Misal y = fc

x = εc

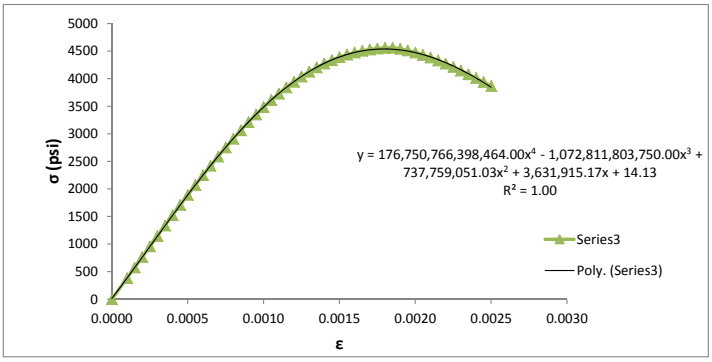
$y = 176{,}750{,}766{,}398{,}464\,x^4 + -1{,}072{,}811{,}803{,}750\,x^3 + 737{,}759{,}051.03\,x^2 + 3{,}631{,}915.17\,x + 14.1$

$\int y = 35{,}350{,}153{,}279{,}693\,x^5 + -268{,}202{,}950{,}938\,x^4 + 245{,}919{,}684\,x^3 + 1{,}815{,}958\,x^2 + 14.1\,x$

$A = 3.45 + -10.48 + 3.84 + 11.35 + 0.04$

A = 8.20

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.846$



RC-O1-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	384.02	2.6
0.00015	575.96	4.0
0.00020	767.78	5.3
0.00025	959.35	6.6
0.00030	1150.53	7.9
0.00035	1341.13	9.2
0.00040	1530.91	10.6
0.00045	1719.61	11.9
0.00050	1906.92	13.1
0.00055	2092.49	14.4
0.00060	2275.93	15.7
0.00065	2456.83	16.9
0.00070	2634.75	18.2
0.00075	2809.20	19.4
0.00080	2979.70	20.5
0.00085	3145.73	21.7
0.00090	3306.78	22.8
0.00095	3462.33	23.9
0.00100	3611.87	24.9
0.00105	3754.89	25.9
0.00110	3890.92	26.8
0.00115	4019.50	27.7
0.00120	4140.22	28.5
0.00125	4252.71	29.3
0.00130	4356.65	30.0
0.00135	4451.77	30.7
0.00140	4537.86	31.3
0.00145	4614.77	31.8
0.00150	4682.42	32.3
0.00155	4740.78	32.7
0.00160	4789.91	33.0
0.00165	4829.90	33.3
0.00170	4860.92	33.5
0.00175	4883.18	33.7
0.00180	4896.97	33.8
0.00185	4902.58	33.8
0.00190	4877.22	33.6
0.00195	4835.96	33.3
0.00200	4785.43	33.0
0.00205	4726.38	32.6
0.00210	4659.61	32.1
0.00215	4585.92	31.6
0.00220	4506.13	31.1
0.00225	4421.05	30.5
0.00230	4331.46	29.9
0.00235	4238.14	29.2
0.00240	4141.80	28.6

$0.9 \times fc' = 33.8$ MPa = 4902.752202 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 18168.35046$ MPa = 2635101.214 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00240$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 3.186376781$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4902.752202}{9000}$ untuk ec/eo >1

$k2 = 1.214750245$

$nk1 = 3.186376781$

$nk2 = 3.870651975$

Luas Kurva = ∫y

Misal y = fc

x = εc

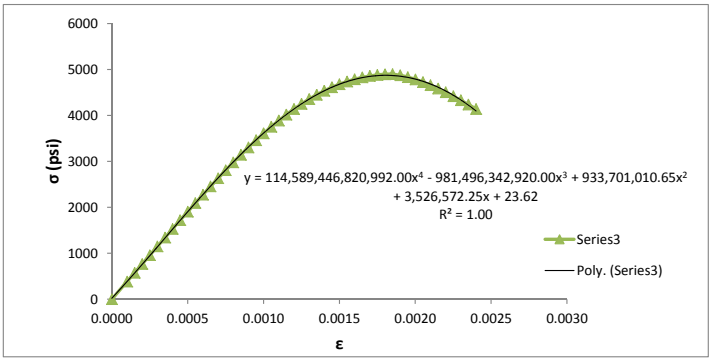
$y = 114{,}589{,}446{,}820{,}992\,x^4 + -981{,}496{,}342{,}920\,x^3 + 933{,}701{,}010.65\,x^2 + 3{,}526{,}572.25\,x + 23.6$

$\int y = 22{,}917{,}889{,}364{,}198\,x^5 + -245{,}374{,}085{,}730\,x^4 + 311{,}233{,}670\,x^3 + 1{,}763{,}286\,x^2 + 23.6\,x$

$A = 1.82 + -8.14 + 4.30 + 10.16 + 0.06$

$A = 8.20$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.820$



RC-O2-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.87	2.6
0.00015	575.37	4.0
0.00020	766.19	5.3
0.00025	955.99	6.6
0.00030	1144.35	7.9
0.00035	1330.84	9.2
0.00040	1515.00	10.4
0.00045	1696.34	11.7
0.00050	1874.37	12.9
0.00055	2048.60	14.1
0.00060	2218.53	15.3
0.00065	2383.68	16.4
0.00070	2543.58	17.5
0.00075	2697.81	18.6
0.00080	2845.96	19.6
0.00085	2987.64	20.6
0.00090	3122.55	21.5
0.00095	3250.39	22.4
0.00100	3370.93	23.2
0.00105	3483.98	24.0
0.00110	3589.41	24.7
0.00115	3687.12	25.4
0.00120	3777.09	26.0
0.00125	3859.33	26.6
0.00130	3933.90	27.1
0.00135	4000.89	27.6
0.00140	4060.44	28.0
0.00145	4112.74	28.4
0.00150	4157.98	28.7
0.00155	4196.40	28.9
0.00160	4228.27	29.2
0.00165	4253.84	29.3
0.00170	4273.42	29.5
0.00175	4287.30	29.6
0.00180	4295.80	29.6
0.00185	4299.23	29.6
0.00190	4284.15	29.5
0.00195	4260.19	29.4
0.00200	4231.36	29.2
0.00205	4198.11	28.9
0.00210	4160.85	28.7
0.00215	4120.00	28.4
0.00220	4075.95	28.1
0.00225	4029.08	27.8
0.00230	3979.74	27.4
0.00235	3928.26	27.1
0.00240	3874.98	26.7
0.00245	3820.17	26.3
0.00250	3764.11	26.0
0.00255	3707.05	25.6
0.00260	3649.22	25.2

0.9 x fc' = 29.6 MPa = 4299.336547 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 15932.24579 MPa = 2310781.064 psi

ε0 = 0.00186

εcu = 0.00260

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.510752143

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{4299.336547}{9000}$$ untuk ec/eo >1

k2 = 1.147704061

nk1 = 2.510752143

nk2 = 2.88160043

Luas Kurva = ∫y

Misal y = fc

x = εc

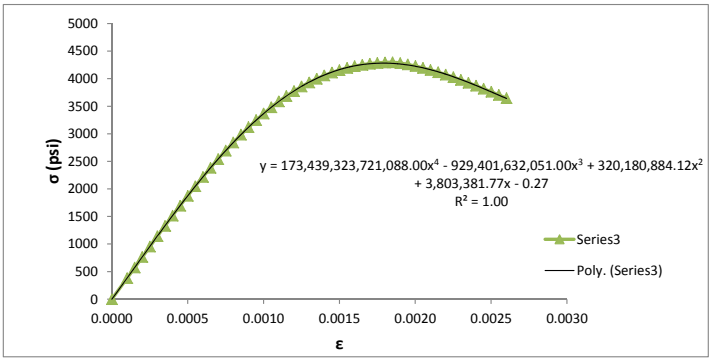
y = 173,439,323,721,088 x^4 + -929,401,632,051 x^3 + 320,180,884.12 x^2 + 3,803,381.77 x + -0.3

∫y = 34,687,864,744,218 x^5 + -232,350,408,013 x^4 + 106,726,961 x^3 + 1,901,691 x^2 + -0.3 x

A = 4.12 + -10.62 + 1.88 + 12.86 + 0.00

A = 8.23

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.867$$



RC-O2-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	382.99	2.6
0.00015	572.51	3.9
0.00020	759.68	5.2
0.00025	943.76	6.5
0.00030	1124.03	7.7
0.00035	1299.83	9.0
0.00040	1470.57	10.1
0.00045	1635.70	11.3
0.00050	1794.75	12.4
0.00055	1947.30	13.4
0.00060	2093.03	14.4
0.00065	2231.67	15.4
0.00070	2363.02	16.3
0.00075	2486.95	17.1
0.00080	2603.39	17.9
0.00085	2712.34	18.7
0.00090	2813.83	19.4
0.00095	2907.96	20.0
0.00100	2994.86	20.6
0.00105	3074.70	21.2
0.00110	3147.68	21.7
0.00115	3214.03	22.2
0.00120	3273.99	22.6
0.00125	3327.82	22.9
0.00130	3375.81	23.3
0.00135	3418.22	23.6
0.00140	3455.35	23.8
0.00145	3487.49	24.0
0.00150	3514.91	24.2
0.00155	3537.91	24.4
0.00160	3556.76	24.5
0.00165	3571.72	24.6
0.00170	3583.06	24.7
0.00175	3591.03	24.8
0.00180	3595.87	24.8
0.00185	3597.81	24.8
0.00190	3591.69	24.8
0.00195	3581.52	24.7
0.00200	3568.94	24.6
0.00205	3554.19	24.5
0.00210	3537.46	24.4
0.00215	3518.94	24.3
0.00220	3498.82	24.1
0.00225	3477.26	24.0
0.00230	3454.42	23.8
0.00235	3430.44	23.7
0.00240	3405.45	23.5
0.00245	3379.59	23.3
0.00250	3352.96	23.1
0.00255	3325.67	22.9
0.00260	3297.82	22.7
0.00265	3269.50	22.5
0.00270	3240.78	22.3
0.00275	3211.75	22.1
0.00280	3182.47	21.9
0.00285	3153.01	21.7
0.00290	3123.41	21.5
0.00295	3093.74	21.3
0.00300	3064.03	21.1

0.9 x fc' = 24.8 MPa = 3597.865847 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 13332.7741 MPa = 1933758.891 psi

ε0 = 0.00186

εcu = 0.00275

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.014255909

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{3597.865847}{9000}$$ untuk ec/eo >1

k2 = 1.069762872

nk1 = 2.014255909

nk2 = 2.154776186

Luas Kurva = ∫y

Misal y = fc

x = εc

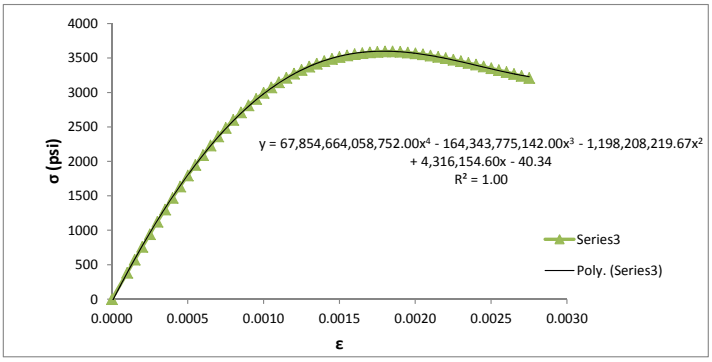
y = 90,672,057,760,448 x^4 + -263,210,616,031 x^3 + -1,157,155,385 x^2 + 4,427,543.70 x + -44

∫y = 18,134,411,552,090 x^5 + -65,802,654,008 x^4 + -385,718,462 x^3 + 2,213,772 x^2 + -44 x

A = 2.85 + -3.76 + -8.02 + 16.74 + -0.12

A = 7.69

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.914$$



RC-O3-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.97	2.6
0.00015	575.75	4.0
0.00020	767.18	5.3
0.00025	958.03	6.6
0.00030	1148.02	7.9
0.00035	1336.83	9.2
0.00040	1524.09	10.5
0.00045	1709.42	11.8
0.00050	1892.39	13.0
0.00055	2072.55	14.3
0.00060	2249.43	15.5
0.00065	2422.56	16.7
0.00070	2591.44	17.9
0.00075	2755.61	19.0
0.00080	2914.57	20.1
0.00085	3067.87	21.2
0.00090	3215.08	22.2
0.00095	3355.77	23.1
0.00100	3489.57	24.1
0.00105	3616.16	24.9
0.00110	3735.22	25.8
0.00115	3846.51	26.5
0.00120	3949.84	27.2
0.00125	4045.07	27.9
0.00130	4132.10	28.5
0.00135	4210.89	29.0
0.00140	4281.45	29.5
0.00145	4343.85	29.9
0.00150	4398.20	30.3
0.00155	4444.66	30.6
0.00160	4483.41	30.9
0.00165	4514.70	31.1
0.00170	4538.77	31.3
0.00175	4555.92	31.4
0.00180	4566.47	31.5
0.00185	4570.74	31.5
0.00190	4551.37	31.4
0.00195	4520.40	31.2
0.00200	4482.97	30.9
0.00205	4439.64	30.6
0.00210	4390.98	30.3
0.00215	4337.52	29.9
0.00220	4279.83	29.5
0.00225	4218.41	29.1
0.00230	4153.77	28.6
0.00235	4086.39	28.2
0.00240	4016.72	27.7
0.00245	3945.18	27.2
0.00250	3872.17	26.7

$0.9 \times fc' = 31.5$ MPa = 4570.873592 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 16938.49289$ MPa = 2456725.131 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00275$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.775587379$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4570.873592}{9000}$ untuk ec/eo >1

$k2 = 1.177874844$

$nk1 = 2.775587379$

$nk2 = 3.26929455$

Luas Kurva = $\int y$

Misal y = fc

$x = \varepsilon c$

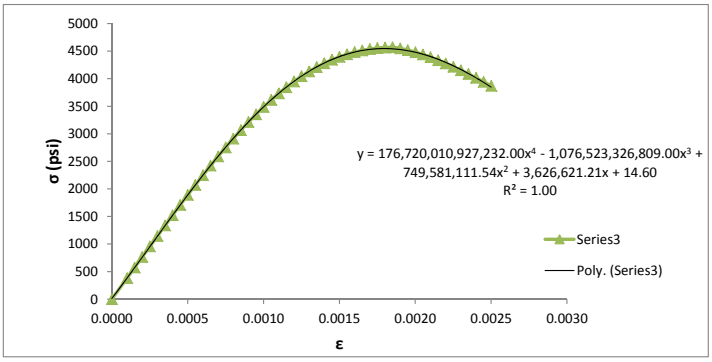
$y = 176{,}720{,}010{,}927{,}232\,x^4 + -1{,}076{,}523{,}326{,}809\,x^3 + 749{,}581{,}111.54\,x^2 + 3{,}626{,}621.21\,x + 14.6$

$\int y = 35{,}344{,}002{,}185{,}446\,x^5 + -269{,}130{,}831{,}702\,x^4 + 249{,}860{,}371\,x^3 + 1{,}813{,}311\,x^2 + 14.6\,x$

$A = 5.56 + -15.39 + 5.20 + 13.71 + 0.04$

$A = 9.12$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.853$



RC-O3-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.71	2.6
0.00015	574.81	4.0
0.00020	764.84	5.3
0.00025	953.33	6.6
0.00030	1139.77	7.9
0.00035	1323.62	9.1
0.00040	1504.35	10.4
0.00045	1681.43	11.6
0.00050	1854.34	12.8
0.00055	2022.56	13.9
0.00060	2185.63	15.1
0.00065	2343.10	16.2
0.00070	2494.55	17.2
0.00075	2639.63	18.2
0.00080	2778.02	19.2
0.00085	2909.45	20.1
0.00090	3033.71	20.9
0.00095	3150.63	21.7
0.00100	3260.10	22.5
0.00105	3362.06	23.2
0.00110	3456.51	23.8
0.00115	3543.46	24.4
0.00120	3623.02	25.0
0.00125	3695.28	25.5
0.00130	3760.41	25.9
0.00135	3818.58	26.3
0.00140	3870.02	26.7
0.00145	3914.95	27.0
0.00150	3953.63	27.3
0.00155	3986.33	27.5
0.00160	4013.33	27.7
0.00165	4034.91	27.8
0.00170	4051.38	27.9
0.00175	4063.01	28.0
0.00180	4070.11	28.1
0.00185	4072.97	28.1
0.00190	4061.10	28.0
0.00195	4042.19	27.9
0.00200	4019.43	27.7
0.00205	3993.16	27.5
0.00210	3963.71	27.3
0.00215	3931.42	27.1
0.00220	3896.57	26.9
0.00225	3859.47	26.6
0.00230	3820.38	26.3
0.00235	3779.56	26.1
0.00240	3737.23	25.8
0.00245	3693.64	25.5
0.00250	3648.97	25.2
0.00255	3603.41	24.8
0.00260	3557.15	24.5
0.00265	3510.33	24.2
0.00270	3463.10	23.9

0.9 x fc' = 28.1 MPa = 4073.055676 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 15093.70653 MPa = 2189161.008 psi

ε0 = 0.00186

εcu = 0.00270

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.325818692

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{4073.055676}{9000}$$ untuk ec/eo >1

k2 = 1.122561742

nk1 = 2.325818692

nk2 = 2.610875081

Luas Kurva = ∫y

Misal y = fc

x = εc

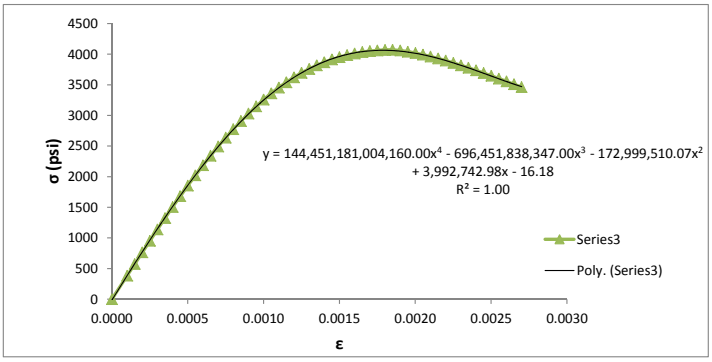
y = 144,451,181,004,160 x^4 + -696,451,838,347 x^3 + -172,999,510.07 x^2 + 3,992,742.98 x + -16

∫y = 28,890,236,200,832 x^5 + -174,112,959,587 x^4 + -57,666,503 x^3 + 1,996,371 x^2 + -16 x

A = 4.15 + -9.25 + -1.14 + 14.55 + -0.04

A = 8.27

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.884$$



RC-O4-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.96	2.6
0.00015	575.70	4.0
0.00020	767.06	5.3
0.00025	957.76	6.6
0.00030	1147.52	7.9
0.00035	1336.00	9.2
0.00040	1522.82	10.5
0.00045	1707.57	11.8
0.00050	1889.80	13.0
0.00055	2069.07	14.3
0.00060	2244.89	15.5
0.00065	2416.79	16.7
0.00070	2584.27	17.8
0.00075	2746.87	18.9
0.00080	2904.10	20.0
0.00085	3055.54	21.1
0.00090	3200.74	22.1
0.00095	3339.32	23.0
0.00100	3470.93	23.9
0.00105	3595.25	24.8
0.00110	3712.01	25.6
0.00115	3821.00	26.3
0.00120	3922.05	27.0
0.00125	4015.03	27.7
0.00130	4099.89	28.3
0.00135	4176.62	28.8
0.00140	4245.25	29.3
0.00145	4305.86	29.7
0.00150	4358.60	30.1
0.00155	4403.61	30.4
0.00160	4441.13	30.6
0.00165	4471.38	30.8
0.00170	4494.64	31.0
0.00175	4511.20	31.1
0.00180	4521.37	31.2
0.00185	4525.49	31.2
0.00190	4506.87	31.1
0.00195	4477.14	30.9
0.00200	4441.27	30.6
0.00205	4399.77	30.3
0.00210	4353.18	30.0
0.00215	4302.04	29.7
0.00220	4246.85	29.3
0.00225	4188.11	28.9
0.00230	4126.29	28.4
0.00235	4061.84	28.0
0.00240	3995.19	27.5
0.00245	3926.73	27.1
0.00250	3856.84	26.6

$0.9 \times fc' = 31.2$ MPa = 4525.617418 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 16770.78504$ MPa = 2432401.12 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00250$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.727635351$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4525.617418}{9000}$ untuk ec/eo >1

$k2 = 1.17284638$

$nk1 = 2.727635351$

$nk2 = 3.199097246$

Luas Kurva = $\int y$

Misal y = fc

x = εc

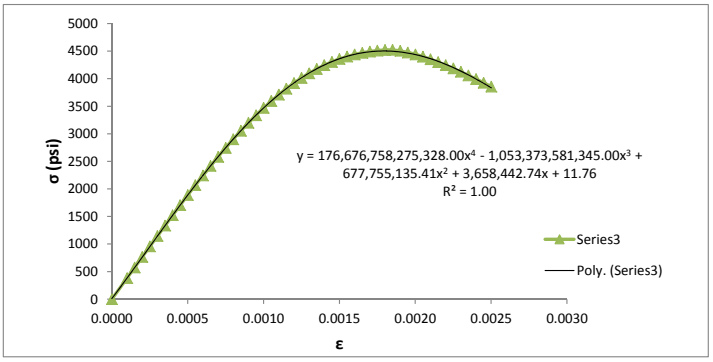
$y = 176{,}676{,}758{,}275{,}328\,x^4 + -1{,}053{,}373{,}581{,}345\,x^3 + 677{,}755{,}135.41\,x^2 + 3{,}658{,}442.74\,x + 11.8$

$\int y = 35{,}335{,}351{,}655{,}066\,x^5 + -263{,}343{,}395{,}336\,x^4 + 225{,}918{,}378\,x^3 + 1{,}829{,}221\,x^2 + 11.8\,x$

$A = 3.45 + -10.29 + 3.53 + 11.43 + 0.03$

$A = 8.16$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.848$



RC-O5-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.87	2.6
0.00015	575.37	4.0
0.00020	766.19	5.3
0.00025	955.99	6.6
0.00030	1144.35	7.9
0.00035	1330.84	9.2
0.00040	1515.00	10.4
0.00045	1696.34	11.7
0.00050	1874.37	12.9
0.00055	2048.60	14.1
0.00060	2218.53	15.3
0.00065	2383.68	16.4
0.00070	2543.58	17.5
0.00075	2697.81	18.6
0.00080	2845.96	19.6
0.00085	2987.64	20.6
0.00090	3122.55	21.5
0.00095	3250.39	22.4
0.00100	3370.93	23.2
0.00105	3483.98	24.0
0.00110	3589.41	24.7
0.00115	3687.12	25.4
0.00120	3777.09	26.0
0.00125	3859.33	26.6
0.00130	3933.90	27.1
0.00135	4000.89	27.6
0.00140	4060.44	28.0
0.00145	4112.74	28.4
0.00150	4157.98	28.7
0.00155	4196.40	28.9
0.00160	4228.27	29.2
0.00165	4253.84	29.3
0.00170	4273.42	29.5
0.00175	4287.30	29.6
0.00180	4295.80	29.6
0.00185	4299.23	29.6
0.00190	4284.15	29.5
0.00195	4260.19	29.4
0.00200	4231.36	29.2
0.00205	4198.11	28.9
0.00210	4160.85	28.7
0.00215	4120.00	28.4
0.00220	4075.95	28.1
0.00225	4029.08	27.8
0.00230	3979.74	27.4
0.00235	3928.26	27.1
0.00240	3874.98	26.7
0.00245	3820.17	26.3
0.00250	3764.11	26.0
0.00255	3707.05	25.6
0.00260	3649.22	25.2

0.9 x fc' = 29.6 MPa = 4299.336547 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 15932.24579 MPa = 2310781.064 psi

ε0 = 0.00186

εcu = 0.00275

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.510752143

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{4299.336547}{9000}$$ untuk ec/eo >1

k2 = 1.147704061

nk1 = 2.510752143

nk2 = 2.88160043

Luas Kurva = ∫y

Misal y = fc

x = εc

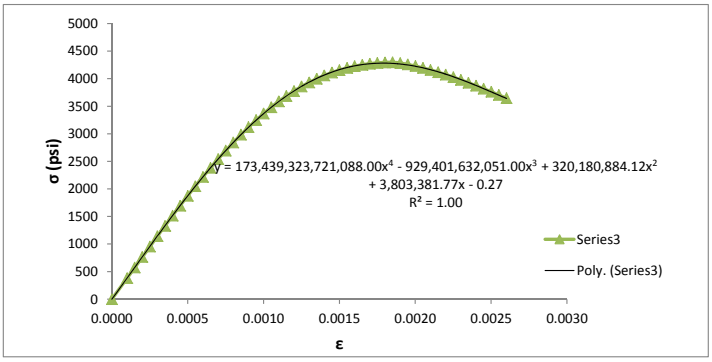
y = 173,439,323,721,088 x^4 + -929,401,632,051.00 x^3 + 320,180,884.12 x^2 + 3,803,381.77 x + -0.3

∫y = 34,687,864,744,218 x^5 + -232,350,408,013 x^4 + 106,726,961 x^3 + 1,901,691 x^2 + -0.3 x

A = 5.46 + -13.29 + 2.22 + 14.38 + 0.00

A = 8.77

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.872$$



RC-O6-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.83	2.6
0.00015	575.21	4.0
0.00020	765.80	5.3
0.00025	955.21	6.6
0.00030	1142.99	7.9
0.00035	1328.68	9.2
0.00040	1511.79	10.4
0.00045	1691.81	11.7
0.00050	1868.23	12.9
0.00055	2040.57	14.1
0.00060	2208.31	15.2
0.00065	2371.00	16.3
0.00070	2528.19	17.4
0.00075	2679.44	18.5
0.00080	2824.40	19.5
0.00085	2962.72	20.4
0.00090	3094.11	21.3
0.00095	3218.32	22.2
0.00100	3335.16	23.0
0.00105	3444.49	23.7
0.00110	3546.21	24.5
0.00115	3640.27	25.1
0.00120	3726.70	25.7
0.00125	3805.53	26.2
0.00130	3876.85	26.7
0.00135	3940.80	27.2
0.00140	3997.55	27.6
0.00145	4047.29	27.9
0.00150	4090.25	28.2
0.00155	4126.67	28.5
0.00160	4156.83	28.7
0.00165	4181.00	28.8
0.00170	4199.49	29.0
0.00175	4212.58	29.0
0.00180	4220.58	29.1
0.00185	4223.81	29.1
0.00190	4209.84	29.0
0.00195	4187.63	28.9
0.00200	4160.93	28.7
0.00205	4130.13	28.5
0.00210	4095.63	28.2
0.00215	4057.80	28.0
0.00220	4017.01	27.7
0.00225	3973.60	27.4
0.00230	3927.90	27.1
0.00235	3880.21	26.8
0.00240	3830.81	26.4
0.00245	3779.98	26.1
0.00250	3727.96	25.7
0.00255	3674.98	25.3
0.00260	3621.24	25.0
0.00265	3566.95	24.6

0.9 x fc' = 29.1 MPa = 4223.90959 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 15652.7327 MPa = 2270241.046 psi

ε0 = 0.00186

εcu = 0.00265

$n = \frac{Ec}{(Ec-Ec')}$

n = 2.445924328

k1 = 1 untuk ec/eo <1

$k2 = 0.67 + \frac{4223.90959}{9000}$ untuk ec/eo >1

k2 = 1.139323288

nk1 = 2.445924328

nk2 = 2.786698547

Luas Kurva = ∫y

Misal y = fc

x = εc

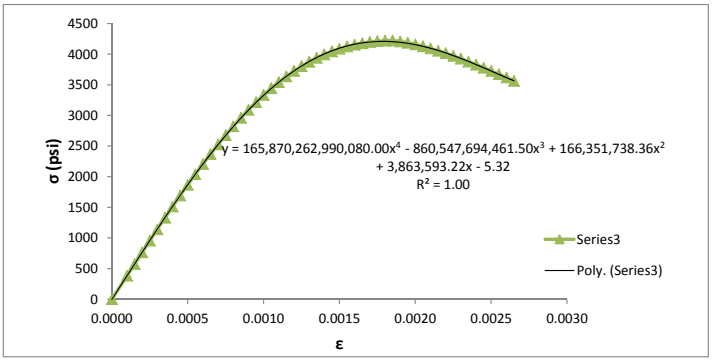
y = 165,870,262,990,080 x^4 + -860,547,694,462 x^3 + 166,351,738.36 x^2 + 3,863,593.22 x + -5.3

∫y = 33,174,052,598,016 x^5 + -215,136,923,615 x^4 + 55,450,579 x^3 + 1,931,797 x^2 + -5.3 x

A = 4.34 + -10.61 + 1.03 + 13.57 + -0.01

A = 8.31

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.873$



RC-O6-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.87	2.6
0.00015	575.37	4.0
0.00020	766.19	5.3
0.00025	955.99	6.6
0.00030	1144.35	7.9
0.00035	1330.84	9.2
0.00040	1515.00	10.4
0.00045	1696.34	11.7
0.00050	1874.37	12.9
0.00055	2048.60	14.1
0.00060	2218.53	15.3
0.00065	2383.68	16.4
0.00070	2543.58	17.5
0.00075	2697.81	18.6
0.00080	2845.96	19.6
0.00085	2987.64	20.6
0.00090	3122.55	21.5
0.00095	3250.39	22.4
0.00100	3370.93	23.2
0.00105	3483.98	24.0
0.00110	3589.41	24.7
0.00115	3687.12	25.4
0.00120	3777.09	26.0
0.00125	3859.33	26.6
0.00130	3933.90	27.1
0.00135	4000.89	27.6
0.00140	4060.44	28.0
0.00145	4112.74	28.4
0.00150	4157.98	28.7
0.00155	4196.40	28.9
0.00160	4228.27	29.2
0.00165	4253.84	29.3
0.00170	4273.42	29.5
0.00175	4287.30	29.6
0.00180	4295.80	29.6
0.00185	4299.23	29.6
0.00190	4284.15	29.5
0.00195	4260.19	29.4
0.00200	4231.36	29.2
0.00205	4198.11	28.9
0.00210	4160.85	28.7
0.00215	4120.00	28.4
0.00220	4075.95	28.1
0.00225	4029.08	27.8
0.00230	3979.74	27.4
0.00235	3928.26	27.1
0.00240	3874.98	26.7
0.00245	3820.17	26.3
0.00250	3764.11	26.0
0.00255	3707.05	25.6
0.00260	3649.22	25.2

$0.9 \times fc' = 29.6$ MPa = 4299.336547 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 15932.24579$ MPa = 2310781.064 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00260$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.510752143$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4299.336547}{9000}$ untuk ec/eo >1

$k2 = 1.147704061$

$nk1 = 2.510752143$

$nk2 = 2.88160043$

Luas Kurva = $\int y$

Misal y = fc

x = εc

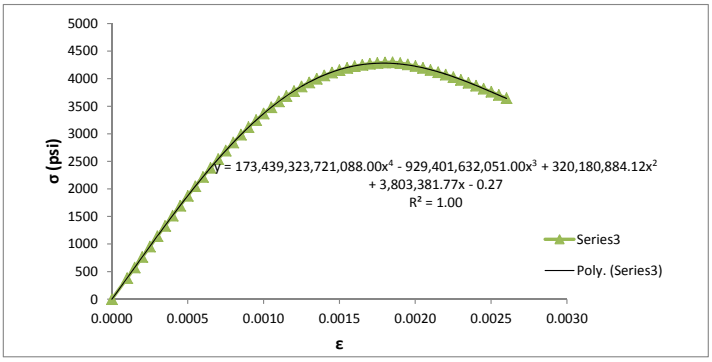
$y = 173{,}439{,}323{,}721{,}088\,x^4 + -929{,}401{,}632{,}051\,x^3 + 320{,}180{,}884.12\,x^2 + 3{,}803{,}381.77\,x + -0.3$

$\int y = 34{,}687{,}864{,}744{,}218\,x^5 + -232{,}350{,}408{,}013\,x^4 + 106{,}726{,}961\,x^3 + 1{,}901{,}691\,x^2 + -0.3\,x$

$A = 4.12 + -10.62 + 1.88 + 12.86 + 0.00$

$A = 8.23$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.867$



RC-O7-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	384.01	2.6
0.00015	575.95	4.0
0.00020	767.74	5.3
0.00025	959.25	6.6
0.00030	1150.33	7.9
0.00035	1340.77	9.2
0.00040	1530.33	10.6
0.00045	1718.72	11.9
0.00050	1905.63	13.1
0.00055	2090.68	14.4
0.00060	2273.48	15.7
0.00065	2453.62	16.9
0.00070	2630.62	18.1
0.00075	2804.02	19.3
0.00080	2973.31	20.5
0.00085	3138.00	21.6
0.00090	3297.56	22.7
0.00095	3451.49	23.8
0.00100	3599.28	24.8
0.00105	3740.46	25.8
0.00110	3874.56	26.7
0.00115	4001.15	27.6
0.00120	4119.85	28.4
0.00125	4230.31	29.2
0.00130	4332.24	29.9
0.00135	4425.40	30.5
0.00140	4509.60	31.1
0.00145	4584.73	31.6
0.00150	4650.73	32.1
0.00155	4707.61	32.5
0.00160	4755.43	32.8
0.00165	4794.32	33.1
0.00170	4824.46	33.3
0.00175	4846.07	33.4
0.00180	4859.43	33.5
0.00185	4864.87	33.5
0.00190	4840.23	33.4
0.00195	4800.26	33.1
0.00200	4751.39	32.8
0.00205	4694.37	32.4
0.00210	4629.94	31.9
0.00215	4558.89	31.4
0.00220	4482.00	30.9
0.00225	4400.02	30.3
0.00230	4313.71	29.7
0.00235	4223.80	29.1
0.00240	4130.95	28.5

$0.9 \times fc' = 33.5$ MPa = 4865.038724 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 18028.59392$ MPa = 2614831.204 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00240$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 3.133673769$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4865.038724}{9000}$ untuk ec/eo >1

$k2 = 1.210559858$

$nk1 = 3.133673769$

$nk2 = 3.793499674$

Luas Kurva = $\int y$

Misal $y = fc$

$x = \varepsilon c$

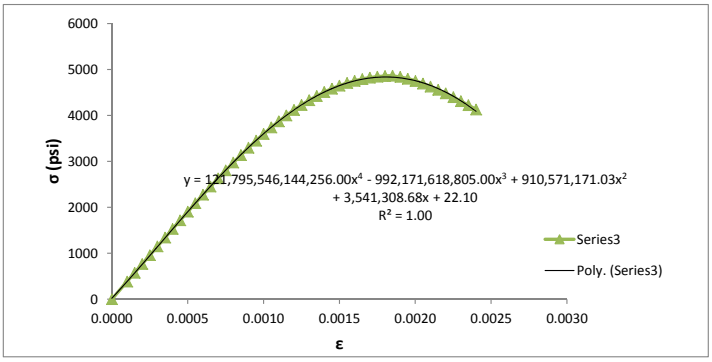
$y = 121{,}795{,}546{,}144{,}256\,x^4 + (-992{,}171{,}618{,}805)\,x^3 + 910{,}571{,}171.03\,x^2 + 3{,}541{,}308.68\,x + 22.1$

$\int y = 24{,}359{,}109{,}228{,}851\,x^5 + (-248{,}042{,}904{,}701)\,x^4 + 303{,}523{,}724\,x^3 + 1{,}770{,}654\,x^2 + 22.1\,x$

$A = 1.94 + (-8.23) + 4.20 + 10.20 + 0.05$

$A = 8.16$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.822$



RC-O7-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.77	2.6
0.00015	575.00	4.0
0.00020	765.31	5.3
0.00025	954.24	6.6
0.00030	1141.31	7.9
0.00035	1326.03	9.1
0.00040	1507.87	10.4
0.00045	1686.32	11.6
0.00050	1860.87	12.8
0.00055	2030.99	14.0
0.00060	2196.22	15.1
0.00065	2356.08	16.2
0.00070	2510.16	17.3
0.00075	2658.06	18.3
0.00080	2799.43	19.3
0.00085	2933.98	20.2
0.00090	3061.46	21.1
0.00095	3181.67	21.9
0.00100	3294.45	22.7
0.00105	3399.71	23.4
0.00110	3497.40	24.1
0.00115	3587.53	24.7
0.00120	3670.14	25.3
0.00125	3745.31	25.8
0.00130	3813.18	26.3
0.00135	3873.91	26.7
0.00140	3927.68	27.1
0.00145	3974.73	27.4
0.00150	4015.29	27.7
0.00155	4049.62	27.9
0.00160	4078.00	28.1
0.00165	4100.72	28.3
0.00170	4118.06	28.4
0.00175	4130.34	28.5
0.00180	4137.83	28.5
0.00185	4140.85	28.6
0.00190	4128.05	28.5
0.00195	4107.69	28.3
0.00200	4083.20	28.2
0.00205	4054.95	28.0
0.00210	4023.31	27.7
0.00215	3988.60	27.5
0.00220	3951.17	27.2
0.00225	3911.33	27.0
0.00230	3869.36	26.7
0.00235	3825.56	26.4
0.00240	3780.16	26.1
0.00245	3733.42	25.7
0.00250	3685.56	25.4
0.00255	3636.78	25.1
0.00260	3587.27	24.7
0.00265	3537.20	24.4

$0.9 \times fc' = 28.6$ MPa = 4140.939937 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 15345.26831$ MPa = 2225647.025 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00265$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.37837356$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4140.939937}{9000}$ untuk ec/eo >1

$k2 = 1.130104437$

$nk1 = 2.37837356$

$nk2 = 2.687810514$

Luas Kurva = $\int y$

Misal y = fc

$x = \varepsilon c$

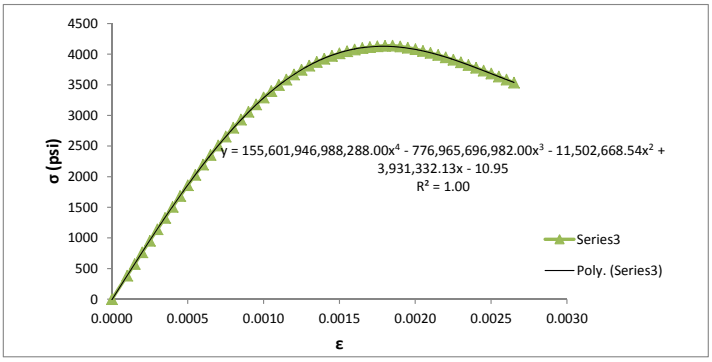
$y = 155{,}601{,}946{,}988{,}288.00\,x^4 + -776{,}965{,}696{,}982\,x^3 + -11{,}502{,}668.54\,x^2 + 3{,}931{,}332.13\,x + -11$

$\int y = 31{,}120{,}389{,}397{,}658\,x^5 + -194{,}241{,}424{,}246\,x^4 + -3{,}834{,}223\,x^3 + 1{,}965{,}666\,x^2 + -11\,x$

$A = 4.07 + -9.58 + -0.07 + 13.80 + -0.03$

$A = 8.19$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.878$



RC-O8-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.92	2.6
0.00015	575.57	4.0
0.00020	766.70	5.3
0.00025	957.03	6.6
0.00030	1146.20	7.9
0.00035	1333.82	9.2
0.00040	1519.49	10.5
0.00045	1702.75	11.7
0.00050	1883.14	13.0
0.00055	2060.17	14.2
0.00060	2233.37	15.4
0.00065	2402.23	16.6
0.00070	2566.30	17.7
0.00075	2725.09	18.8
0.00080	2878.18	19.8
0.00085	3025.14	20.9
0.00090	3165.59	21.8
0.00095	3299.20	22.7
0.00100	3425.65	23.6
0.00105	3544.70	24.4
0.00110	3656.13	25.2
0.00115	3759.81	25.9
0.00120	3855.61	26.6
0.00125	3943.48	27.2
0.00130	4023.43	27.7
0.00135	4095.50	28.2
0.00140	4159.77	28.7
0.00145	4216.37	29.1
0.00150	4265.49	29.4
0.00155	4307.31	29.7
0.00160	4342.08	29.9
0.00165	4370.05	30.1
0.00170	4391.52	30.3
0.00175	4406.77	30.4
0.00180	4416.12	30.4
0.00185	4419.90	30.5
0.00190	4402.98	30.4
0.00195	4376.04	30.2
0.00200	4343.58	29.9
0.00205	4306.11	29.7
0.00210	4264.09	29.4
0.00215	4218.00	29.1
0.00220	4168.28	28.7
0.00225	4115.37	28.4
0.00230	4059.69	28.0
0.00235	4001.63	27.6
0.00240	3941.55	27.2
0.00245	3879.80	26.8
0.00250	3816.71	26.3
0.00255	3752.56	25.9

0.9 x fc' = 30.5 MPa = 4420.019678 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 16379.46672 MPa = 2375645.094 psi

ε0 = 0.00186

εcu = 0.00255

$$n = \frac{Ec}{(Ec-Ec')}$$

n = 2.621940998

k1 = 1 untuk ec/eo <1

$$k2 = 0.67 + \frac{4420.019678}{9000}$$ untuk ec/eo >1

k2 = 1.161113298

nk1 = 2.621940998

nk2 = 3.044370559

Luas Kurva = ∫y

Misal y = fc

x = εc

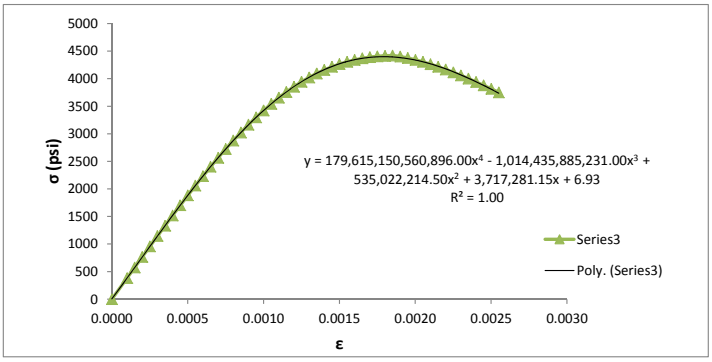
y = 179,615,150,560,896.00 x^4 + -1,014,435,885,231 x^3 + 535,022,214.50 x^2 + 3,717,281.15 x + 6.93

∫y = 35,923,030,112,179 x^5 + -253,608,971,308 x^4 + 178,340,738 x^3 + 1,858,641 x^2 + 6.93 x

A = 3.87 + -10.72 + 2.96 + 12.09 + 0.02

A = 8.21

$$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.857$$



RC-O8-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.06	2.6
0.00015	572.72	3.9
0.00020	760.13	5.2
0.00025	944.57	6.5
0.00030	1125.32	7.8
0.00035	1301.75	9.0
0.00040	1473.25	10.2
0.00045	1639.26	11.3
0.00050	1799.31	12.4
0.00055	1952.98	13.5
0.00060	2099.92	14.5
0.00065	2239.85	15.4
0.00070	2372.55	16.4
0.00075	2497.88	17.2
0.00080	2615.76	18.0
0.00085	2726.15	18.8
0.00090	2829.09	19.5
0.00095	2924.64	20.2
0.00100	3012.93	20.8
0.00105	3094.12	21.3
0.00110	3168.39	21.8
0.00115	3235.96	22.3
0.00120	3297.07	22.7
0.00125	3351.97	23.1
0.00130	3400.94	23.4
0.00135	3444.25	23.7
0.00140	3482.19	24.0
0.00145	3515.04	24.2
0.00150	3543.10	24.4
0.00155	3566.63	24.6
0.00160	3585.92	24.7
0.00165	3601.25	24.8
0.00170	3612.86	24.9
0.00175	3621.03	25.0
0.00180	3625.99	25.0
0.00185	3627.98	25.0
0.00190	3621.53	25.0
0.00195	3610.87	24.9
0.00200	3597.74	24.8
0.00205	3582.36	24.7
0.00210	3564.94	24.6
0.00215	3545.69	24.4
0.00220	3524.78	24.3
0.00225	3502.40	24.1
0.00230	3478.70	24.0
0.00235	3453.83	23.8
0.00240	3427.93	23.6
0.00245	3401.13	23.4
0.00250	3373.54	23.3
0.00255	3345.29	23.1
0.00260	3316.46	22.9
0.00265	3287.16	22.7
0.00270	3257.46	22.5
0.00275	3227.44	22.3
0.00280	3197.18	22.0
0.00285	3166.73	21.8
0.00290	3136.16	21.6
0.00295	3105.52	21.4
0.00300	3074.86	21.2

$0.9 \times fc' = 25.0$ MPa = 3628.03663 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 13444.57934$ MPa = 1949974.898 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00300$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.031534702$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{3628.03663}{9000}$ untuk ec/eo >1

$k2 = 1.073115181$

$nk1 = 2.031534702$

$nk2 = 2.18007073$

Luas Kurva = $\int y$

Misal y = fc

$x = \varepsilon c$

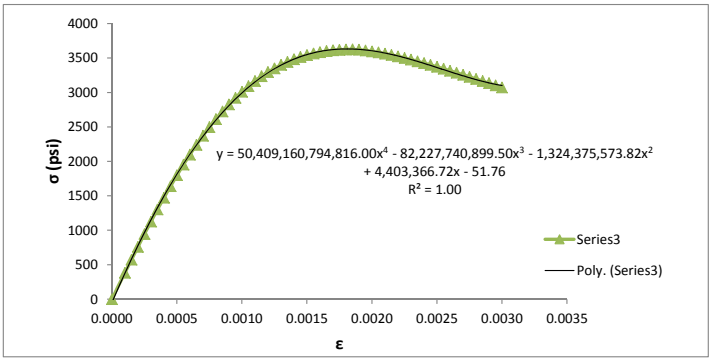
$y = 50{,}409{,}160{,}794{,}816\,x^4 + -82{,}227{,}740{,}900\,x^3 + -1{,}324{,}375{,}573.82\,x^2 + 4{,}403{,}366.72\,x + -52$

$\int y = 10{,}081{,}832{,}158{,}963\,x^5 + -20{,}556{,}935{,}225\,x^4 + -441{,}458{,}525\,x^3 + 2{,}201{,}683\,x^2 + -52\,x$

$A = 2.45 + -1.67 + -11.92 + 19.82 + -0.16$

$A = 8.53$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.922$



RC-O9-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.84	2.6
0.00015	575.26	4.0
0.00020	765.93	5.3
0.00025	955.45	6.6
0.00030	1143.42	7.9
0.00035	1329.35	9.2
0.00040	1512.78	10.4
0.00045	1693.21	11.7
0.00050	1870.13	12.9
0.00055	2043.04	14.1
0.00060	2211.46	15.2
0.00065	2374.89	16.4
0.00070	2532.90	17.5
0.00075	2685.06	18.5
0.00080	2830.98	19.5
0.00085	2970.32	20.5
0.00090	3102.76	21.4
0.00095	3228.07	22.3
0.00100	3346.01	23.1
0.00105	3456.46	23.8
0.00110	3559.28	24.5
0.00115	3654.44	25.2
0.00120	3741.92	25.8
0.00125	3821.76	26.4
0.00130	3894.05	26.8
0.00135	3958.90	27.3
0.00140	4016.48	27.7
0.00145	4066.98	28.0
0.00150	4110.61	28.3
0.00155	4147.62	28.6
0.00160	4178.28	28.8
0.00165	4202.87	29.0
0.00170	4221.68	29.1
0.00175	4235.00	29.2
0.00180	4243.15	29.3
0.00185	4246.44	29.3
0.00190	4232.13	29.2
0.00195	4209.41	29.0
0.00200	4182.08	28.8
0.00205	4150.56	28.6
0.00210	4115.25	28.4
0.00215	4076.53	28.1
0.00220	4034.79	27.8
0.00225	3990.36	27.5
0.00230	3943.59	27.2
0.00235	3894.79	26.9
0.00240	3844.25	26.5
0.00245	3792.26	26.1
0.00250	3739.05	25.8
0.00255	3684.87	25.4
0.00260	3629.94	25.0

$0.9 \times fc' = 29.3$ MPa = 4246.537677 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 15736.58663$ MPa = 2282403.051 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00260$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.465018418$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4246.537677}{9000}$ untuk ec/eo >1

$k2 = 1.14183752$

$nk1 = 2.465018418$

$nk2 = 2.814650516$

Luas Kurva = $\int y$

Misal y = fc

x = εc

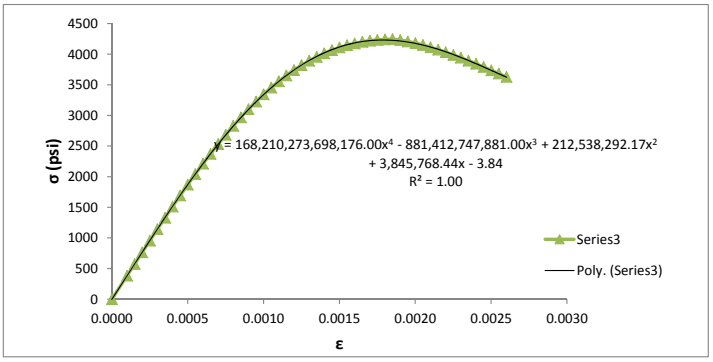
$y = 168{,}210{,}273{,}698{,}176\,x^4 + (-881{,}412{,}747{,}881.00)\,x^3 + 212{,}538{,}292.17\,x^2 + 3{,}845{,}768.44\,x + (-3.8)$

$\int y = 33{,}642{,}054{,}739{,}635\,x^5 + (-220{,}353{,}186{,}970)\,x^4 + 70{,}846{,}097\,x^3 + 1{,}922{,}884\,x^2 + (-3.8)\,x$

$A = 4.00 + (-10.07) + 1.25 + 13.00 + (-0.01)$

$A = 8.16$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.870$



RC-O9-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.74	2.6
0.00015	574.92	4.0
0.00020	765.11	5.3
0.00025	953.85	6.6
0.00030	1140.64	7.9
0.00035	1324.98	9.1
0.00040	1506.34	10.4
0.00045	1684.20	11.6
0.00050	1858.02	12.8
0.00055	2027.31	14.0
0.00060	2191.59	15.1
0.00065	2350.40	16.2
0.00070	2503.32	17.3
0.00075	2649.97	18.3
0.00080	2790.03	19.2
0.00085	2923.19	20.2
0.00090	3049.24	21.0
0.00095	3167.99	21.8
0.00100	3279.30	22.6
0.00105	3383.09	23.3
0.00110	3479.33	24.0
0.00115	3568.05	24.6
0.00120	3649.29	25.2
0.00125	3723.16	25.7
0.00130	3789.80	26.1
0.00135	3849.38	26.5
0.00140	3902.11	26.9
0.00145	3948.21	27.2
0.00150	3987.92	27.5
0.00155	4021.52	27.7
0.00160	4049.28	27.9
0.00165	4071.48	28.1
0.00170	4088.43	28.2
0.00175	4100.42	28.3
0.00180	4107.73	28.3
0.00185	4110.68	28.3
0.00190	4098.30	28.3
0.00195	4078.59	28.1
0.00200	4054.88	28.0
0.00205	4027.52	27.8
0.00210	3996.87	27.6
0.00215	3963.25	27.3
0.00220	3926.98	27.1
0.00225	3888.38	26.8
0.00230	3847.71	26.5
0.00235	3805.25	26.2
0.00240	3761.24	25.9
0.00245	3715.92	25.6
0.00250	3669.50	25.3
0.00255	3622.17	25.0
0.00260	3574.13	24.6
0.00265	3525.52	24.3
0.00270	3476.52	24.0

$0.9 \times fc' = 28.3$ MPa = 4110.769154 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 15233.46308$ MPa = 2209431.018 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00270$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.354725535$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4110.769154}{9000}$ untuk ec/eo >1

$k2 = 1.126752128$

$nk1 = 2.354725535$

$nk2 = 2.653192008$

Luas Kurva = $\int y$

Misal y = fc

x = εc

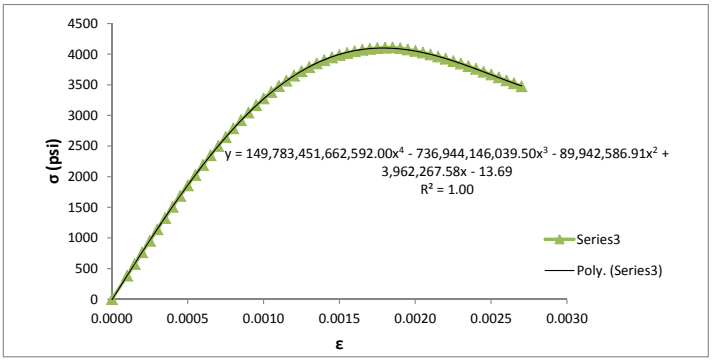
$y = 149{,}783{,}451{,}662{,}592\,x^4 + -736{,}944{,}146{,}040\,x^3 + -89{,}942{,}586.91\,x^2 + 3{,}962{,}267.58\,x + -14$

$\int y = 29{,}956{,}690{,}332{,}518\,x^5 + -184{,}236{,}036{,}510\,x^4 + -29{,}980{,}862\,x^3 + 1{,}981{,}134\,x^2 + -14\,x$

$A = 4.30 + -9.79 + -0.59 + 14.44 + -0.04$

$A = 8.32$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.882$



RC-O10-1

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.87	2.6
0.00015	575.38	4.0
0.00020	766.23	5.3
0.00025	956.06	6.6
0.00030	1144.47	7.9
0.00035	1331.04	9.2
0.00040	1515.30	10.4
0.00045	1696.77	11.7
0.00050	1874.96	12.9
0.00055	2049.37	14.1
0.00060	2219.51	15.3
0.00065	2384.90	16.4
0.00070	2545.07	17.5
0.00075	2699.59	18.6
0.00080	2848.05	19.6
0.00085	2990.07	20.6
0.00090	3125.33	21.5
0.00095	3253.53	22.4
0.00100	3374.44	23.3
0.00105	3487.86	24.0
0.00110	3593.66	24.8
0.00115	3691.75	25.5
0.00120	3782.08	26.1
0.00125	3864.66	26.6
0.00130	3939.56	27.2
0.00135	4006.86	27.6
0.00140	4066.70	28.0
0.00145	4119.26	28.4
0.00150	4164.73	28.7
0.00155	4203.36	29.0
0.00160	4235.40	29.2
0.00165	4261.12	29.4
0.00170	4280.81	29.5
0.00175	4294.77	29.6
0.00180	4303.32	29.7
0.00185	4306.77	29.7
0.00190	4291.58	29.6
0.00195	4267.44	29.4
0.00200	4238.39	29.2
0.00205	4204.89	29.0
0.00210	4167.35	28.7
0.00215	4126.18	28.4
0.00220	4081.80	28.1
0.00225	4034.56	27.8
0.00230	3984.84	27.5
0.00235	3932.98	27.1
0.00240	3879.29	26.7
0.00245	3824.07	26.4
0.00250	3767.59	26.0
0.00255	3710.11	25.6
0.00260	3651.86	25.2

0.9 x fc' = 29.7 MPa = 4306.879242 psi

Ec = 26,478.15 MPa = 3840337.766 psi

Ec' = fc'/eo

= 15960.19709 MPa = 2314835.066 psi

ε0 = 0.00186

εcu = 0.00260

$n = \frac{Ec}{(Ec-Ec')}$

n = 2.517424431

k1 = 1 untuk ec/eo <1

$k2 = 0.67 + \frac{4306.879242}{9000}$ untuk ec/eo >1

k2 = 1.148542138

nk1 = 2.517424431

nk2 = 2.891368038

Luas Kurva = ∫y

Misal y = fc

x = εc

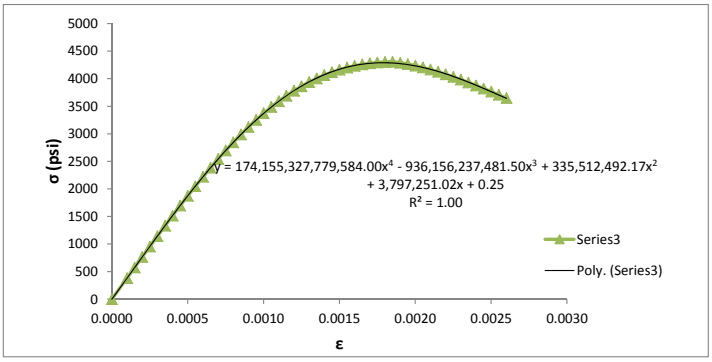
y = 174,155,327,779,584 x^4 + -936,156,237,482 x^3 + 335,512,492.17 x^2 + 3,797,251.02 x + 0.25

∫y = 34,831,065,555,917 x^5 + -234,039,059,370 x^4 + 111,837,497 x^3 + 1,898,626 x^2 + 0.25 x

A = 4.14 + -10.70 + 1.97 + 12.83 + 0.00

A = 8.24

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.866$



RC-O10-2

REGANGAN	Fc (PSI)	Fc (MPa)
0.00000	0.00	0.0
0.00010	383.99	2.6
0.00015	575.85	4.0
0.00020	767.45	5.3
0.00025	958.60	6.6
0.00030	1149.08	7.9
0.00035	1338.61	9.2
0.00040	1526.88	10.5
0.00045	1713.54	11.8
0.00050	1898.19	13.1
0.00055	2080.41	14.3
0.00060	2259.77	15.6
0.00065	2435.80	16.8
0.00070	2608.01	18.0
0.00075	2775.93	19.1
0.00080	2939.05	20.3
0.00085	3096.90	21.4
0.00090	3249.00	22.4
0.00095	3394.89	23.4
0.00100	3534.15	24.4
0.00105	3666.38	25.3
0.00110	3791.21	26.1
0.00115	3908.34	26.9
0.00120	4017.48	27.7
0.00125	4118.43	28.4
0.00130	4211.02	29.0
0.00135	4295.14	29.6
0.00140	4370.73	30.1
0.00145	4437.79	30.6
0.00150	4496.39	31.0
0.00155	4546.62	31.3
0.00160	4588.65	31.6
0.00165	4622.66	31.9
0.00170	4648.90	32.1
0.00175	4667.64	32.2
0.00180	4679.19	32.3
0.00185	4683.87	32.3
0.00190	4662.55	32.1
0.00195	4628.31	31.9
0.00200	4586.78	31.6
0.00205	4538.58	31.3
0.00210	4484.34	30.9
0.00215	4424.69	30.5
0.00220	4360.24	30.1
0.00225	4291.61	29.6
0.00230	4219.37	29.1
0.00235	4144.09	28.6
0.00240	4066.29	28.0
0.00245	3986.46	27.5

$0.9 \times fc' = 32.3$ MPa = 4684.014027 psi

$Ec = 26{,}478.15$ MPa = 3840337.766 psi

$Ec' = fc'/eo$

$= 17357.76251$ MPa = 2517535.159 psi

$\varepsilon 0 = 0.00186$

$\varepsilon cu = 0.00245$

$n = \frac{Ec}{(Ec-Ec')}$

$n = 2.903182793$

$k1 = 1$ untuk ec/eo <1

$k2 = 0.67 + \frac{4684.014027}{9000}$ untuk ec/eo >1

$k2 = 1.190446003$

$nk1 = 2.903182793$

$nk2 = 3.456082353$

Luas Kurva = $\int y$

Misal y = fc

x = εc

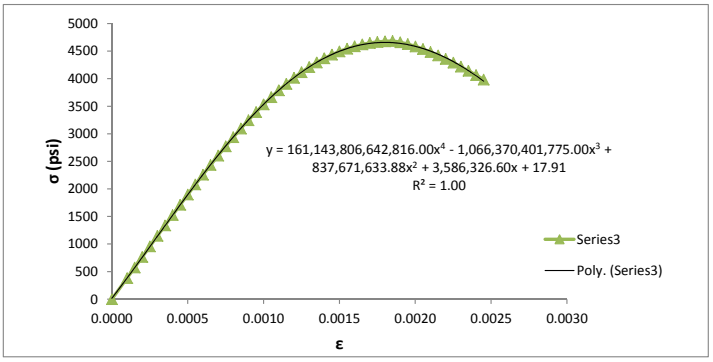
$y = 161{,}143{,}806{,}642{,}816\,x^4 + -1{,}066{,}370{,}401{,}775.00\,x^3 + 837{,}671{,}633.88\,x^2 + 3{,}586{,}326.60\,x + 17.9$

$\int y = 32{,}228{,}761{,}328{,}563\,x^5 + -266{,}592{,}600{,}444\,x^4 + 279{,}223{,}878\,x^3 + 1{,}793{,}163\,x^2 + 17.9\,x$

$A = 2.84 + -9.61 + 4.11 + 10.76 + 0.04$

$A = 8.15$

$B1 = \frac{A}{0.85 \times fc' \times \varepsilon cu} = 0.836$



LAMPIRAN 7

KUAT LENTUR BALOK BETON BERTULANG

Nilai Kuat Lentur Analitis Balok Beton Bertulang Normal

No	Kode Balok	fc'	fc'	b	h	p	d'	n	ds	As	β1	ρ	ρmin	ρmaks	Ket.ρ	a	Mn
		(Mpa)	(kg/cm2)	cm	cm	cm	cm	-	cm	cm2				ρmin < ρ < ρmaks			kg.cm
1	RC-N1-1	30.80	314.06	15	25	200	2	2.00	1.20	2.26	0.912	0.007	0.004	0.034	OK	2.14	171190.89
2	RC-N1-2	25.77	262.79	15	25	200	2	2.00	1.20	2.26	0.943	0.007	0.004	0.029	OK	2.47	169887.29
3	RC-N2-2	30.91	315.24	15	25	200	2	2.00	1.20	2.26	0.912	0.007	0.004	0.034	OK	2.13	171215.68
4	RC-N3-1	23.11	235.69	15	25	200	2	2.00	1.20	2.26	0.960	0.007	0.004	0.027	OK	2.71	168966.07
5	RC-N4-1	31.78	324.07	15	25	200	2	2.00	1.20	2.26	0.906	0.007	0.004	0.035	OK	2.09	171395.40
6	RC-N5-1	40.16	409.51	15	25	200	2	2.00	1.20	2.26	0.845	0.007	0.004	0.041	OK	1.77	172627.16
7	RC-N5-2	43.68	445.45	15	25	200	2	2.00	1.20	2.26	0.817	0.007	0.004	0.043	OK	1.68	172967.18
8	RC-N6-1	41.78	426.01	15	25	200	2	2.00	1.20	2.26	0.796	0.007	0.004	0.040	OK	1.80	172489.55
9	RC-N6-2	30.11	306.99	15	25	200	2	2.00	1.20	2.26	0.916	0.007	0.004	0.033	OK	2.18	171038.00
10	RC-N7-1	38.77	395.37	15	25	200	2	2.00	1.20	2.26	0.856	0.007	0.004	0.040	OK	1.81	172472.31
11	RC-N7-2	37.67	384.18	15	25	200	2	2.00	1.20	2.26	0.856	0.007	0.004	0.039	OK	1.86	172266.57
12	RC-N8-1	37.56	383.00	15	25	200	2	2.00	1.20	2.26	0.868	0.007	0.004	0.039	OK	1.84	172346.65
13	RC-N8-2	39.87	406.57	15	25	200	2	2.00	1.20	2.26	0.847	0.007	0.004	0.041	OK	1.78	172590.28
14	RC-N9-1	38.71	394.78	15	25	200	2	2.00	1.20	2.26	0.856	0.007	0.004	0.040	OK	1.81	172464.76
15	RC-N10-1	41.03	418.35	15	25	200	2	2.00	1.20	2.26	0.840	0.007	0.004	0.041	OK	1.74	172728.80
16	RC-N10-2	39.87	406.57	15	25	200	2	2.00	1.20	2.26	0.847	0.007	0.004	0.041	OK	1.78	172590.28
																	171827.30

Nilai Kuat Lentur Analitis Balok Beton Bertulang Limbah Onyx

No	Kode Balok	fc'	fc'	b	h	p	d'	n	ds	As	β1	ρ	ρmin	ρmaks	Ket.ρ	a	Mn
		(Mpa)	(kg/cm2)	cm	cm	cm	cm	-	cm	cm2				ρmin < ρ < ρmaks			kg.cm
1	RC-O1-1	31.78	324.07	15	25	200	2	2.00	1.20	2.26	0.846	0.007	0.004	0.032	OK	2.23	170814.77
2	RC-O1-2	37.56	383.00	15	25	200	2	2.00	1.20	2.26	0.820	0.007	0.004	0.037	OK	1.95	171921.51
3	RC-O2-1	32.94	335.86	15	25	200	2	2.00	1.20	2.26	0.867	0.007	0.004	0.034	OK	2.10	171321.54
4	RC-O2-2	27.56	281.06	15	25	200	2	2.00	1.20	2.26	0.914	0.007	0.004	0.030	OK	2.38	170231.50
5	RC-O3-1	35.02	357.07	15	25	200	2	2.00	1.20	2.26	0.853	0.007	0.004	0.036	OK	2.01	171688.50
6	RC-O3-2	31.20	318.18	15	25	200	2	2.00	1.20	2.26	0.884	0.007	0.004	0.033	OK	2.18	171039.74
7	RC-O4-1	34.67	353.54	15	25	200	2	2.00	1.20	2.26	0.848	0.007	0.004	0.035	OK	2.04	171561.70
8	RC-O5-1	32.94	335.86	15	25	200	2	2.00	1.20	2.26	0.872	0.007	0.004	0.035	OK	2.09	171376.22
9	RC-O6-1	32.36	329.97	15	25	200	2	2.00	1.20	2.26	0.873	0.007	0.004	0.034	OK	2.12	171239.70
10	RC-O6-2	32.94	335.86	15	25	200	2	2.00	1.20	2.26	0.873	0.007	0.004	0.035	OK	2.09	171385.24
11	RC-O7-1	37.27	380.05	15	25	200	2	2.00	1.20	2.26	0.867	0.007	0.004	0.039	OK	1.86	172276.63
12	RC-O7-2	31.72	323.48	15	25	200	2	2.00	1.20	2.26	0.878	0.007	0.004	0.034	OK	2.16	171119.95
13	RC-O8-1	33.86	345.29	15	25	200	2	2.00	1.20	2.26	0.857	0.007	0.004	0.035	OK	2.07	171456.46
14	RC-O8-2	27.79	283.42	15	25	200	2	2.00	1.20	2.26	0.922	0.007	0.004	0.031	OK	2.34	170381.56
15	RC-O9-1	32.53	331.73	15	25	200	2	2.00	1.20	2.26	0.870	0.007	0.004	0.034	OK	2.12	171248.40
16	RC-O9-2	31.49	321.13	15	25	200	2	2.00	1.20	2.26	0.882	0.007	0.004	0.033	OK	2.16	171096.52
17	RC-O10-1	32.99	336.45	15	25	200	2	2.00	1.20	2.26	0.866	0.007	0.004	0.034	OK	2.10	171331.80
18	RC-O10-2	35.88	365.91	15	25	200	2	2.00	1.20	2.26	0.836	0.007	0.004	0.036	OK	2.00	171718.66
																	171289.47

Nilai Kuat Lentur Analitis Balok Beton Bertulang Normal ($\beta_{1\ SNI}$)

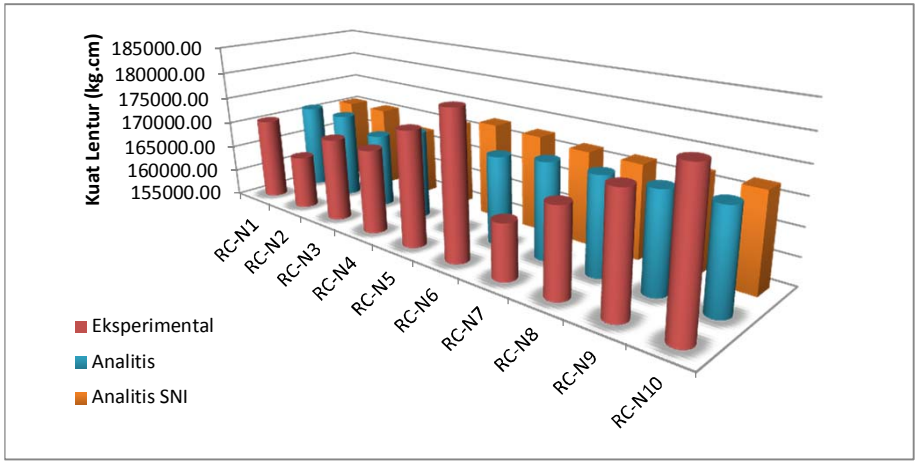
No	Kode Balok	fc'	fc'	b	h	p	d'	n	ds	As	β1	ρ	ρmin	ρmaks	Ket.ρ	a	Mn
		(Mpa)	(kg/cm2)	cm	cm	cm	cm	-	cm	cm2				ρmin < ρ < ρmaks			kg.cm
1	RC-N1	30.80	314.06	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.032	**OK**	2.29	170578.77
2	RC-N2	30.91	315.24	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.032	**OK**	2.29	170612.25
3	RC-N3	23.11	235.69	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.024	**OK**	3.06	167601.08
4	RC-N4	31.78	324.07	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.033	**OK**	2.22	170855.58
5	RC-N5	43.68	445.45	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.042	**OK**	1.72	172825.78
6	RC-N6	41.78	426.01	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.040	**OK**	1.80	172519.59
7	RC-N7	37.67	384.18	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.036	**OK**	1.99	171755.72
8	RC-N8	37.56	383.00	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.036	**OK**	2.00	171731.79
9	RC-N9	38.71	394.78	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.037	**OK**	1.94	171964.70
10	RC-N10	39.87	406.57	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.038	**OK**	1.88	172184.11
																	171262.94

Nilai Kuat Lentur Analitis Balok Beton Bertulang Limbah Onyx ($\beta_{1\ SNI}$)

No	Kode Balok	fc'	fc'	b	h	p	d'	n	ds	As	β1	ρ	ρmin	ρmaks	Ket.ρ	a	Mn
		(Mpa)	(kg/cm2)	cm	cm	cm	cm	-	cm	cm2				ρmin < ρ < ρmaks			kg.cm
1	RC-O1	31.78	324.07	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.033	**OK**	2.22	170855.58
2	RC-O2	32.94	335.86	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.034	**OK**	2.15	171160.09
3	RC-O3	35.02	357.07	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.034	**OK**	2.14	171165.27
4	RC-O4	34.67	353.54	15	25	200	2	2.00	1.20	2.26	0.800	0.007	0.004	0.033	**OK**	2.17	171081.58
5	RC-O5	32.94	335.86	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.034	**OK**	2.15	171160.09
6	RC-O6	32.36	329.97	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.033	**OK**	2.18	171010.55
7	RC-O7	31.72	323.48	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.032	**OK**	2.23	170839.77
8	RC-O8	33.86	345.29	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.035	**OK**	2.09	171388.74
9	RC-O9	31.49	321.13	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.032	**OK**	2.24	170775.96
10	RC-O10	32.99	336.45	15	25	200	2	2.00	1.20	2.26	0.850	0.007	0.004	0.034	**OK**	2.14	171174.76
																	171061.24

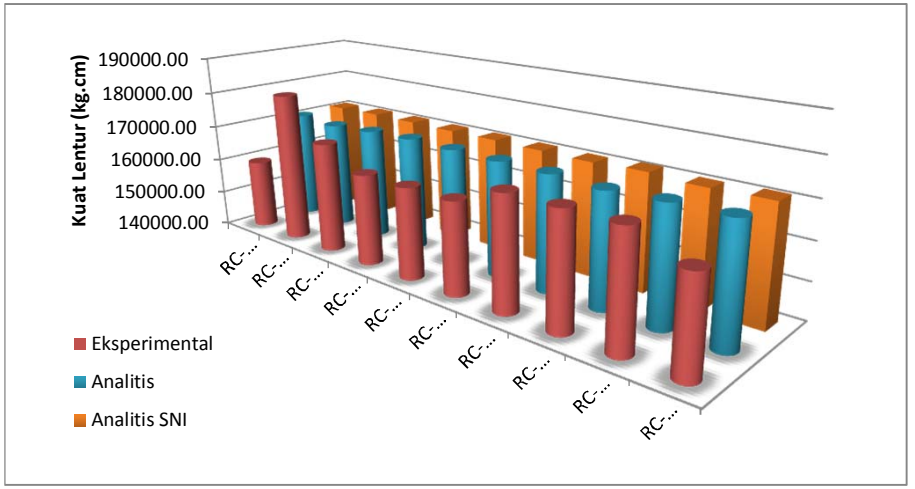
Data Perbandingan Kuat Lentur Analitis dengan Eksperimental Balok Beton Bertulang Normal

No	Kode Balok	fc'	β1	Kuat Lentur Analitis (β_1)	Kuat Lentur Eksperimental	Kuat Lentur Analitis SNI
		(Mpa)		kg.cm	kg.cm	
1	RC-N1	30.80	0.912	171190.89	170500.00	170578.77
2	RC-N2	30.91	0.912	171215.68	165000.00	170612.25
3	RC-N3	23.11	0.960	168966.07	170500.00	167601.08
4	RC-N4	31.78	0.906	171395.40	170500.00	170855.58
5	RC-N5	40.16	0.817	172627.16	176000.00	172825.78
6	RC-N6	30.11	0.796	171038.00	181500.00	172519.59
7	RC-N7	37.67	0.856	172266.57	165000.00	171755.72
8	RC-N8	37.56	0.868	172346.65	170500.00	171731.79
9	RC-N9	38.71	0.856	172464.76	175560.00	171964.70
10	RC-N10	39.87	0.847	172590.28	181197.50	172184.11
Rata - rata				171610.15	172625.75	171262.94



Data Perbandingan Kuat Lentur Analitis dengan Eksperimental Balok Beton Bertulang Onyx

No	Kode Balok	fc'	β1	Kuat Lentur Analitis (β1)	Kuat Lentur Eksperimental	Kuat Lentur Analitis SNI
		(Mpa)		kg.cm	kg.cm	
1	RC-O1	31.78	0.846	170814.77	159500.00	170855.58
2	RC-O2	27.56	0.867	170231.50	181500.00	171160.09
3	RC-O3	31.20	0.853	171039.74	170500.00	171165.27
4	RC-O4	34.67	0.848	171561.70	165000.00	171081.58
5	RC-O5	32.94	0.872	171376.22	165000.00	171160.09
6	RC-O6	32.36	0.873	171239.70	165000.00	171010.55
7	RC-O7	31.72	0.878	171119.95	170500.00	170839.77
8	RC-O8	27.79	0.857	170381.56	170500.00	171388.74
9	RC-O9	31.49	0.882	171096.52	170500.00	170775.96
10	RC-O10	32.99	0.866	171331.80	165000.00	171174.76
				171019.35	168300.00	171061.24
						2761.24



LAMPIRAN 8

DOKUMENTASI PENELITIAN

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Bongkahan Batu Onyx Besar

Gambar : Pemotongan Batu Onyx

Gambar : Limbah Batu Onyx

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Analisis Ayakan

Gambar : Pengayakan Kerikil

Gambar : Pengayakan Limbah Batu Onyx

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pembersihan Agregat Limbah Batu Onyx

Gambar : Penakaran Agregat

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Bekisting dan Tulangan Balok

Gambar : Bekisting dan Tulangan Balok

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pengolesan Oli pada Bekisting

Gambar : Pemasangan Tulangan

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pemasangan Pengaku Bekisting

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Penempelan Strain Gauges pada Tulangan

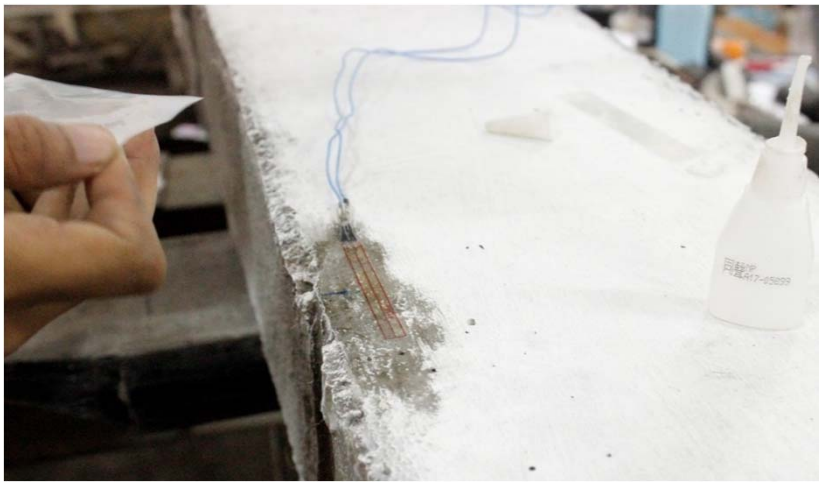
Gambar : Strain Gauges Terpasang

Gambar : Pelapisan Strain Gauges dengan Lem

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Strain Gauges Seri PL-60-11

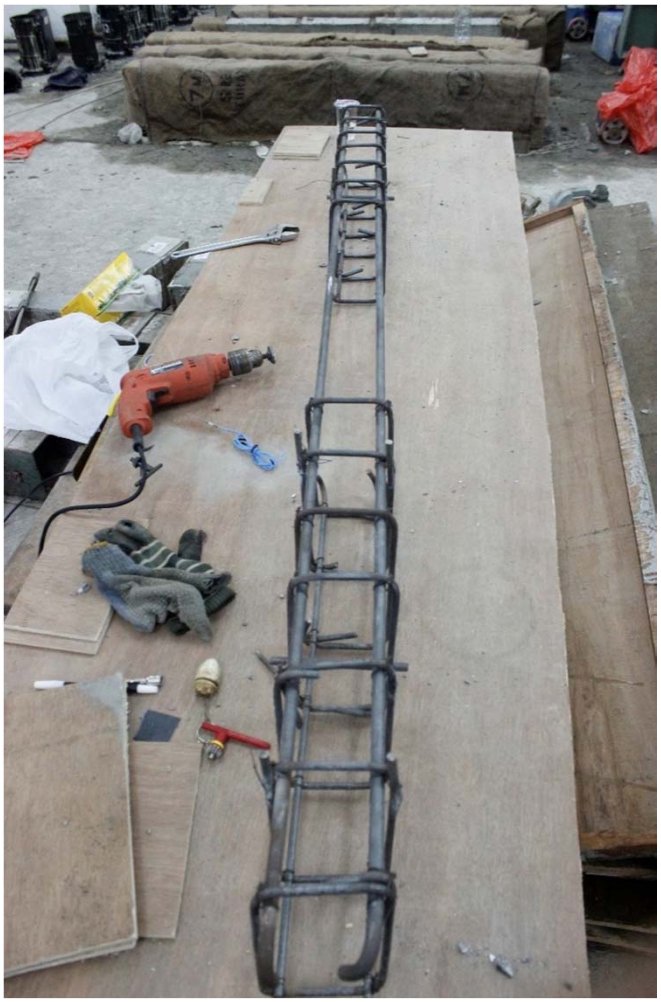
Gambar : Peletakan Strain Gauges pada Beton



Gambar : Strain Gauges Terpasang

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pengamplasan Tulangan

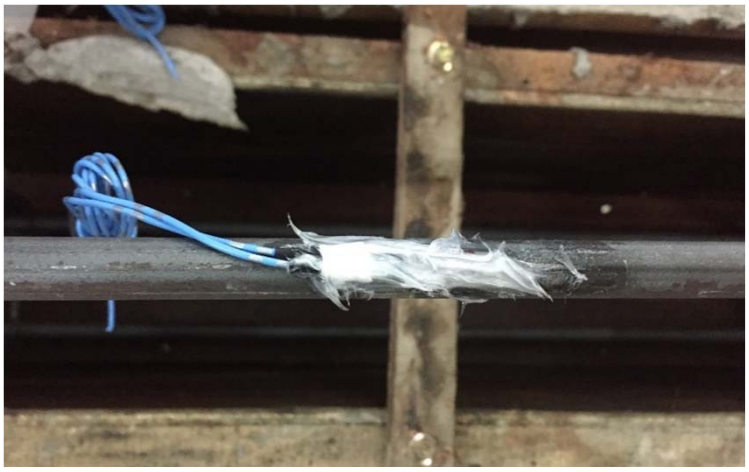


Gambar : Tulangan Sudah Diamplas

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Penempelan Strain Gauges

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX



Gambar : Strain Gauges pada Tulangan

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Material Beton

Gambar : Penakaran Air

Gambar : Penimbangan Semen

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pencampuran Material

Gambar : Pengecoran Balok

Gambar : Pemerataan Permukaan Balok

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Balok Selesai Dicor

Gambar : Pengecoran Silinder Beton

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Silinder Selesai Dicor

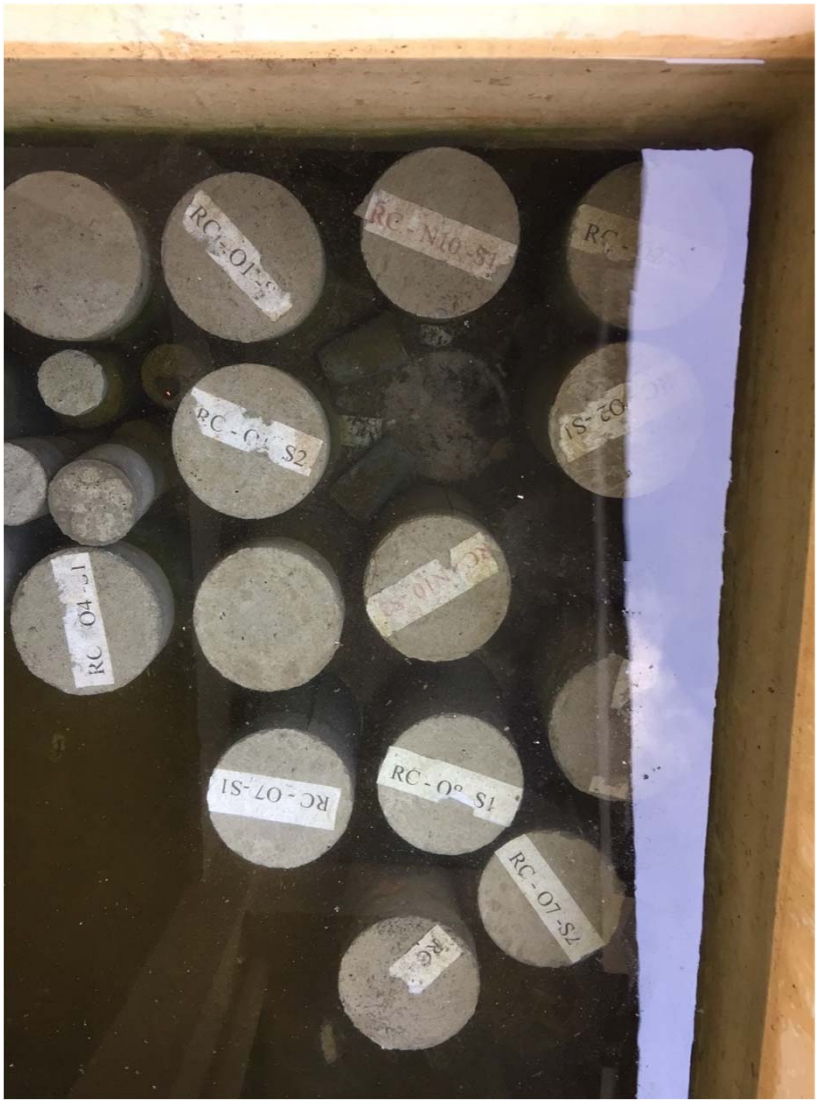
LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pemadatan Slump

Gambar : Tinggi Slump

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Curing Balok



Gambar : Curing Silinder

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pompa Pembebanan

Gambar : Dial Pembebanan

Gambar : Penyetelan Strain Meter

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Dial LVDT

Gambar : Pembacaan Strain Meter

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Pengecatan Balok

Gambar : Membuat Garis Balok

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Capping Silinder

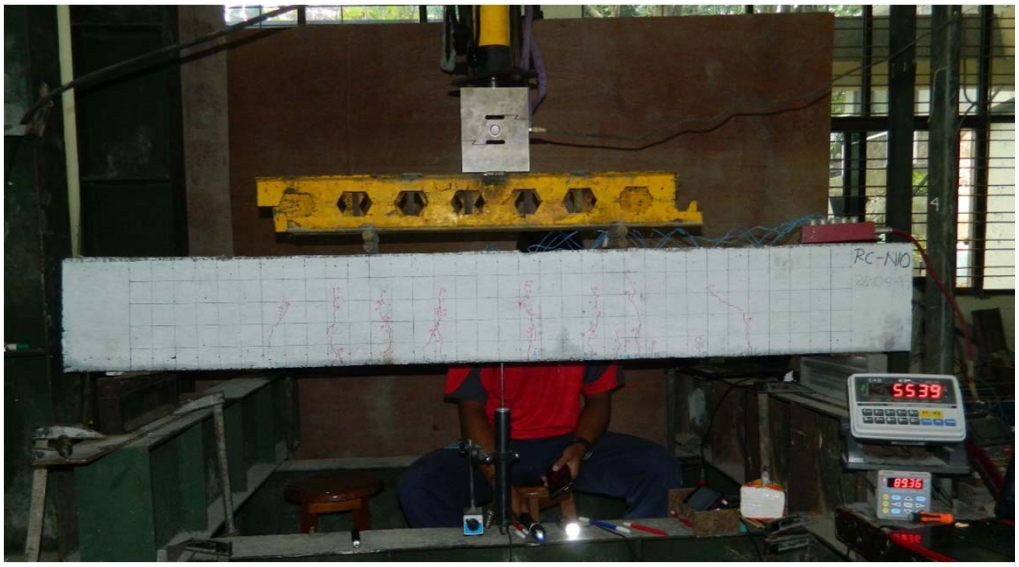
Gambar : Pemasangan Extension Meter

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX

Gambar : Penyetelan Alat Uji Tekan

Gambar : Hasil Akhir Pengujian Tekan

LAMPIRAN DOKUMENTASI PENELITIAN BETON ONYX



Gambar : Dial Pembebanan

Gambar : Pengujian Kuat Lentur